DCR-PC106E/PC107E

RMT-830

SERVICE MANUAL

LEVEL 1

Ver 1.0 2004. 03

Revision History

Photo : DCR-PC107E

DCR-PC106E/PC107E

AEP Model

UK Model

DCR-PC106E

East European Model

DCR-PC107E

North European Model

Z (Z200) MECHANISM

Link

SPECIFICATIONS | ACCESSORIES

- INSTRUCTION MANUAL is shown at the end of this document.

Mini DV Digital Video Cassette

DIGITAL VIDEO CAMERA RECORDER

SONY

HANDYCAM InfoLITHIUM F SERIES

SPECIFICATIONS

Video camera recorder

System

Video recording system
2 rotary heads, Helical scanning system
Audio recording system
Rotary heads, PCM system
Quantization: 12 bits (Fs 32 kHz, stereo 1, stereo 2), 16 bits (Fs 48 kHz, stereo)
Video signal
PAL color, CCIR standards
Usable cassette
Mini DV cassette with the Mini DV mark printed
Tape speed
SP: Approx. 18.81 mm/s
LP: Approx. 12.56 mm/s
Recording/playback time (using a DVM60 cassette)
SP: 60 min
LP: 90 min
Fast forward/rewind time (using a DVM60 cassette)
Approx. 2 min 40 s
Viewfinder
Electric viewfinder (black and white)
Image device
3 mm (1/6 type) CCD (Charge Coupled Device)
Gross: Approx. 800 000 pixels
Effective (movie): Approx. 400 000 pixels
Lens
Carl Zeiss Vario Tessar
Combined power zoom lens
Filter diameter: 25 mm (1 in.)
10× (Optical), 120 × (Digital)
F = 1.7 ~ 2.3
Focal length
2.3 - 23 mm (3/32 - 29/32 in.)
When converted to a 35 mm still camera
In CAMERA:
43 - 430 mm (1 3/4 - 17 in.)
Color temperature
[AUTO], [ONE PUSH], [INDOOR] (3 200 K), [OUTDOOR] (5 800 K)
Minimum illumination
5 lx (lux) (F 1.7)
0 lx (lux) (during the NightShot plus function)*
* Objects unable to be seen due to the dark can be shot with infrared lighting.

Input/Output connectors

Audio/Video output
AV MINI JACK
Video signal: 1 Vp-p, 75Ω (ohms), unbalanced, sync negative
Audio signal: 327 mV (at output impedance more than 47 kΩ (kilohms)), Output impedance with less than 2.2 kΩ (kilohms)
LANC jack
Stereo mini-minijack (ø 2.5 mm)
MIC jack
Minijack, 0.388 mV low impedance with DC 2.5 to 3.0 V, output impedance 6.8 kΩ (kilohms) (ø 3.5 mm), Stereo type

LCD screen

Picture
6.2 cm (2.5 type)
Total dot number
123 200 (560 × 220)

General

Power requirements
DC 7.2 V (battery pack)
DC 8.4 V (AC Adaptor)
Average power consumption (when using the battery pack)
During camera recording using the viewfinder
2.2 W
During camera recording using the LCD
2.5 W
Operating temperature
0° C to 40° C (32° F to 104° F)
Storage temperature
-20° C to + 60° C (-4° F to + 140° F)
Dimensions (approx.)
50 × 95 × 97 mm (2 × 3 3/4 × 3 7/8 in.) (w/h/d)
Mass (approx.)
375 g (13 oz) main unit only
440 g (15 oz) including the NP-FF51 rechargeable battery pack and DVM60 cassette.
Supplied accessories
See page 4.

Handycam Station
DCR-PC107E: DCRA-C112
DCR-PC106E: DCRA-C113

S video output
4-pin mini DIN
Luminance signal: 1 Vp-p, 75Ω (ohms), unbalanced
Chrominance signal: 0.3 Vp-p, 75Ω (ohms), unbalanced
Audio/Video output
AV MINI JACK
Video signal: 1 Vp-p, 75Ω (ohms), unbalanced, sync negative
Audio signal: 327 mV, (at output impedance more than 47 kΩ (kilohms))
Output impedance with less than 2.2 kΩ (kilohms)
USB jack
mini-B
DV input (For DCR-PC107E)/output
4-pin connector

AC Adaptor AC-L25A/L25B

Power requirements
AC 100 - 240 V, 50/60 Hz
Current consumption
0.35 - 0.18 A
Power consumption
18 W
Output voltage
DC 8.4 V, 1.5 A
Operating temperature
0° C to 40° C (32° F to 104° F)
Storage temperature
-20° C to + 60° C (-4° F to + 140° F)
Dimensions (approx.)
56 × 31 × 100 mm (2 1/4 × 1 1/4 × 4 in.) (w/h/d) excluding the projecting parts
Mass (approx.)
190 g (6.7 oz) excluding the mains lead

Rechargeable battery pack (NP-FF51)

Maximum output voltage
DC 8.4 V
Output voltage
DC 7.2 V
Capacity
5.6 Wh (780 mAh)
Dimensions (approx.)
40.8 × 12.5 × 49.1 mm
(1 5/8 × 1/2 × 1 15/16 in.) (w/h/d)
Mass (approx.)
45 g (1.6 oz)
Operating temperature
0°C to 40°C (32°F to 104°F)
Type
Lithium ion

Design and specifications are subject to change without notice.

Types of differences

DCR-PC	106E	107E
DV Interface	OUT	IN/OUT

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer.

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.
3. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
4. Look for parts which, through functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
5. Check the B+ voltage to see it is at the values specified.
6. Flexible Circuit Board Repairing
   - Keep the temperature of the soldering iron around 270˚C during repairing.
   - Do not touch the soldering iron on the same conductor of the circuit board (within 3 times).
   - Be careful not to apply force on the conductor when soldering or unsoldering.

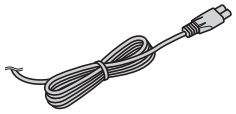
SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

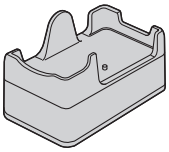
CAUTION :
Danger of explosion if battery is incorrectly replaced.
Replace only with the same or equivalent type.

Checking supplied accessories.

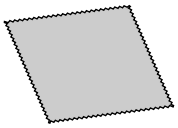
Make sure that the following accessories are supplied with your camcorder.



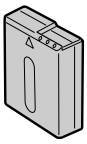
Power cord (Main lead) (1)
(AEP, EE, NE model)
⚠ 1-769-608-11
Power cord (Main lead) (1)
(UK model)
⚠ 1-783-374-11



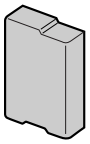
Handycam station (1)
(DCRA-C112)
(PC107E)
1-818-213-31
(DCRA-C113)
(PC106E)
1-818-213-41



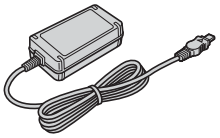
Cleaning cloth (1)
3-073-861-01



Rechargeable battery pack
(NP-FF51) (1)
A-7097-021-A

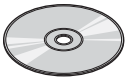


Battery terminal cover (1)
3-070-945-11

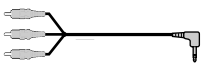


AC Adaptor
(AC-L25A/L25B) (1)
⚠ 1-477-534-11

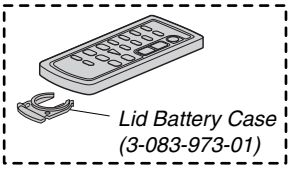
USB cable (1)
1-824-382-21



CD-ROM
(SPVD-012 USB Driver) (1)
3-087-821-01



A/V connecting cable (1)
1-824-097-11



Lid Battery Case
(3-083-973-01)

Wireless Remote Commander
(RMT-830) (1)
1-477-898-71

21-pin adaptor (1)
1-770-783-21

• Abbreviation
EE : East European model
NE : North European model

Other accessories

3-087-936-11 MANUAL (PC), INSTRUCTION(ENGLISH) (PC106E:AEP,UK/PC107E:AEP,UK)
3-087-936-21 MANUAL (PC), INSTRUCTION(FRENCH) (PC106E:AEP/PC107E:AEP)
3-087-936-31 MANUAL (PC), INSTRUCTION(SPANISH/PORTUGUESE) (PC106E:AEP/PC107E:AEP)
3-087-936-41 MANUAL (PC), INSTRUCTION(ITALIAN/GREEK) (PC106E:AEP/PC107E:AEP)
3-087-936-51 MANUAL (PC), INSTRUCTION(GERMAN/DUTCH) (PC106E:AEP/PC107E:AEP)
3-087-936-61 MANUAL (PC), INSTRUCTION(SWEDISH/RUSSIAN) (PC107E:NE)
3-087-936-71 MANUAL (PC), INSTRUCTION(DANISH/FINNISH) (PC107E:NE)
3-089-179-11 MANUAL, INSTRUCTION(ENGLISH) (PC106E:AEP,UK/PC107E:AEP,UK)
3-089-179-21 MANUAL, INSTRUCTION(FRENCH) (PC106E:AEP/PC107E:AEP)
3-089-179-31 MANUAL, INSTRUCTION(SPANISH/PORTUGUESE) (PC106E:AEP/PC107E:AEP)
3-089-179-41 MANUAL, INSTRUCTION(ITALIAN/GREEK) (PC106E:AEP/PC107E:AEP)
3-089-179-51 MANUAL, INSTRUCTION(GERMAN/DUTCH) (PC106E:AEP/PC107E:AEP)
3-089-179-61 MANUAL, INSTRUCTION(SWEDISH/RUSSIAN) (PC107E:NE)
3-089-179-71 MANUAL, INSTRUCTION(DANISH/FINNISH) (PC107E:NE)

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

9-876-707-41

Sony EMCS Co.

2004C1600-1
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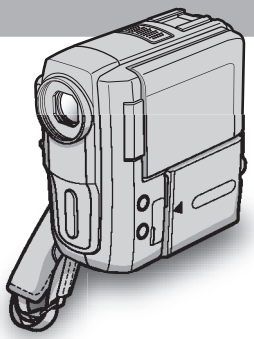
Published by DI CS Strategy Div.

SONY

3-089-179-**11**(1)

Camera Operations Guide

Read this first



Digital Video Camera Recorder

HANDYCAM

DCR-PC106E/PC107E

Mini DV Digital Video Cassette

InfoLITHIUM F SERIES

© 2004 Sony Corporation

Read this first

Before operating the unit, please read this manual thoroughly, and retain it for future reference.

WARNING

To prevent fire or shock hazard, do not expose the unit to rain or moisture.

To avoid electrical shock, do not open the cabinet. Refer servicing to qualified personnel only.

FOR CUSTOMERS IN THE UNITED KINGDOM

NOTICE ON THE SUPPLIED AC ADAPTOR

A moulded plug complying with BS1363 is fitted to this equipment for your safety and convenience.

Should the fuse in the plug supplied need to be replaced, a fuse of the same rating as the supplied one and approved by ASTA or BSI to BS1362 (i.e., marked with ⟨ASTA⟩ or ⟨BSI⟩ mark) must be used.

If the plug supplied with this equipment has a detachable fuse cover, be sure to attach the fuse cover after you change the fuse. Never use the plug without the fuse cover. If you should lose the fuse cover, please contact your nearest Sony service station.

FOR CUSTOMERS IN EUROPE

ATTENTION

The electromagnetic fields at the specific frequencies may influence the picture and sound of this camcorder.

This product has been tested and found compliant with the limits set out in the EMC Directive for using connection cables shorter than 3 meters (9.8 feet).

Notice

If static electricity or electromagnetic interference causes data transfer to discontinue midway (fail), restart the application or disconnect and connect the USB cable again.

Notes on use

Note on Cassette Memory

Your camcorder is based on the DV format. You can use only mini DV cassettes in your camcorder. Use of mini DV cassettes with Cassette Memory is recommended as you can use Title search (p. 41), Date search (p. 42), Photo search (p. 42), [TITLE] (p. 52), [TAPE TITLE] (p. 54).

Cassettes with Cassette Memory are marked with CM.

Notes on recording

- Before starting to record, test the recording function to make sure the picture and sound are recorded without any problems.
- Compensation for the contents of recordings cannot be provided, even if recording or playback is not possible due to a malfunction of the camcorder, etc.
- TV color systems differ depending on the countries/regions. To view your recordings on a TV, you need a PAL system-based TV.
- Television programs, films, video tapes, and other materials may be copyrighted. Unauthorized recording of such materials may be contrary to the copyright laws.

Notes on the LCD panel, viewfinder, and lens

- The LCD screen and the viewfinder are manufactured using extremely high-precision technology, so over 99.99% of the pixels are operational for effective use.
  However, there may be some tiny black points and/or bright points (white, red, blue, or green in color) that appear constantly on the LCD screen and the viewfinder.
  These points are normal results of the manufacturing process and do not affect the recording in any way.
- Exposing the LCD screen, the viewfinder, or the lens to direct sunlight for long periods of time may cause malfunctions. Be careful when placing the camera near a window or outdoors.
- Do not aim at the sun. Doing so might cause your camcorder to malfunction. Take pictures of the sun only in low light conditions, such as at dusk.

Note on connecting other device

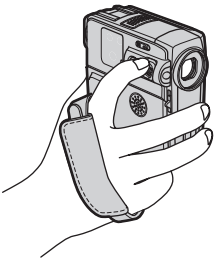
Before connecting your camcorder to other device such as a VCR or a computer with a USB or i.LINK cable, be sure to insert the connector plug in the proper direction. If you insert the connector plug forcibly in the wrong direction, the terminal may be damaged, or this may cause a malfunction of your camcorder.

Notes on using this manual

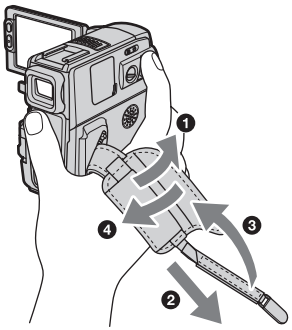
- The images of the LCD screen and the viewfinder used on this manual are captured using a digital still camera, and thus may appear different from what you see.
- The illustrations used on this manual are based on the model DCR-PC107E.

Notes on using the camcorder

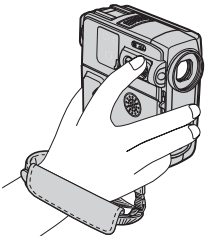
- Hold your camcorder, putting your wrist through the belt and your fingers lightly on the finger rest.



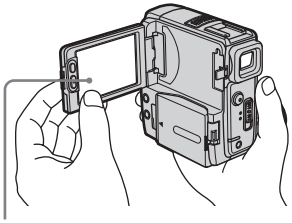
- To ensure a good grip, fasten the Strap Belt as shown in the following illustration. If the Strap Belt hangs out too far, tuck it in the hand pad.



- You can also use the Strap Belt as a wrist strap. For details on the Strap Belt, see page 96.

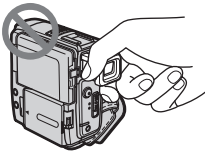


- When you are using the touch panel, place your hand on the back side of the LCD panel to support it. Then, touch the buttons displayed on the screen.
- Unavailable buttons will be grayed out.

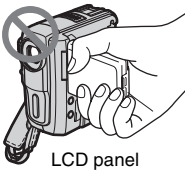


Touch the button on the LCD screen.

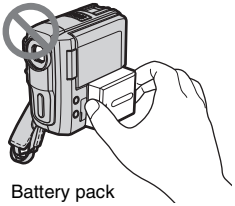
- You can change the language to be used for screen display on your camcorder (p. 21).
- Be careful not to press buttons beside the LCD screen accidentally when you open or close the LCD panel, or when you adjust the angle of the LCD panel.
- Do not hold the camcorder by the following parts.



Viewfinder



LCD panel

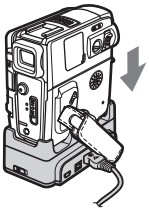


Battery pack

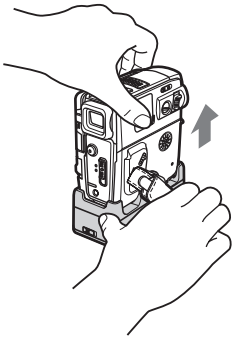
Notes on handling the Handycam Station

- When attaching your camcorder to the Handycam Station, insert your camcorder in the direction of the arrow as shown in the following illustration. Be sure to insert it all the way.

➡*continued*



- When removing your camcorder from the Handycam Station, hold both your camcorder and the Handycam Station as shown in the following illustration, and remove it from the Handycam Station.



Notes

- When disconnecting the AC Adaptor from the Handycam Station, hold both the DC plug and the Handycam Station and disconnect the AC Adaptor.
- Be sure to turn the power of your camcorder off before inserting it into or removing it from the Handycam Station.
- You may not be able to attach your camcorder to the Handycam Station when the jack cover is opened or when the Strap Belt is in the unit and the Handycam Station.
- Do not connect the A/V connecting cables or the AC Adaptors to both your camcorder and the Handycam Station simultaneously while using your camcorder. This may cause a malfunction.

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Refer also to other operating instructions supplied with your camcorder:

- Editing images with your computer →Computer Applications Guide

Quick Start Guide

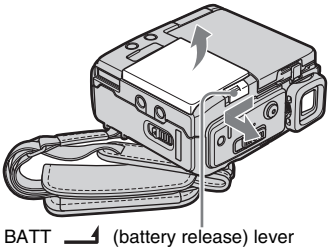
Recording movies

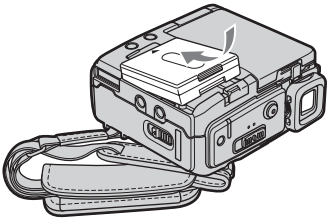
1 Attach the charged battery pack to the camcorder.

To charge the battery, see page 12.

❶ **Slide the BATT ⊿ (battery release) lever and remove the battery terminal cover.**

❷ **Attach the battery pack with its terminal side facing your camcorder as shown in the illustration and press down the battery pack until it clicks.**



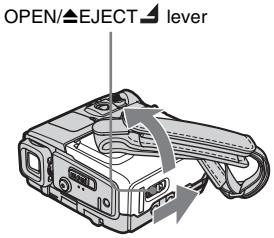


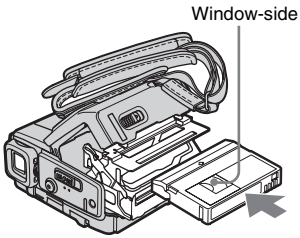
2 Insert a cassette into the camcorder.

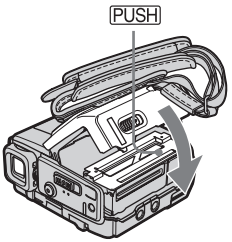
❶ **Slide the OPEN/⏏EJECT⊿ lever in the direction of the arrow to open the lid.**
The cassette compartment comes out automatically.

❷ **Insert the cassette with its window-side facing up, then push the center of the back of the cassette.**

❸ **Press PUSH.**
Close the cassette lid after the cassette compartment slides back in by itself.







3 Start recording while checking the subject on the LCD screen.

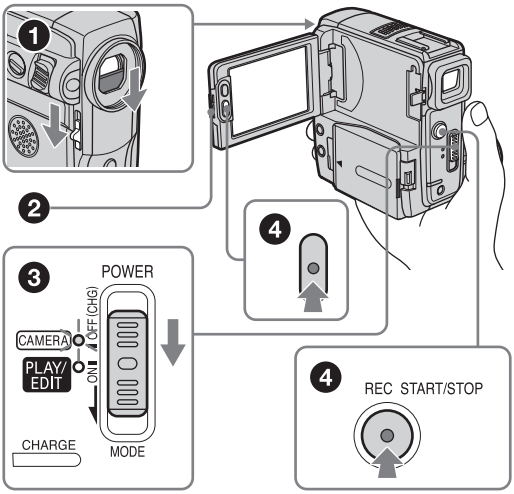
The date and time is not set up in the default setting. To set the date and time, see page 18.

❶ **Set the LENS COVER switch to OPEN.**

❷ **Open the LCD panel.**

❸ **While pressing the green button, slide the POWER switch down to light up the CAMERA lamp.**
The power turns on.

❹ **Press REC START/STOP.**
Recording starts. To change to the standby mode, press REC START/STOP again.
You can also record by pressing REC START/STOP beside the LCD screen.



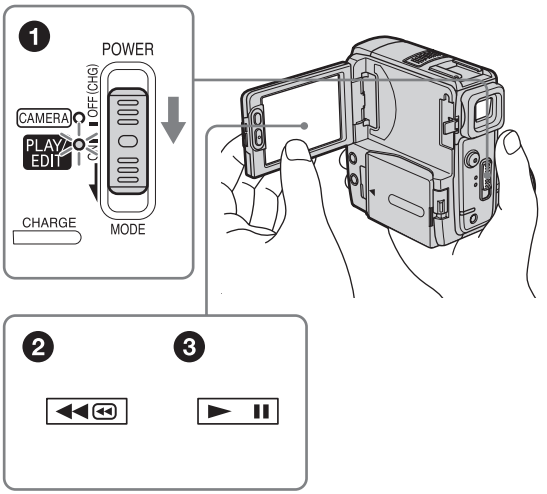
4 View the recorded picture on the LCD screen.

❶ **Slide the POWER switch repeatedly until the PLAY/EDIT lamp lights up.**

❷ **Touch ◀◀ (rewind).**

❸ **Touch ►II (play) to start the playback.**
To stop, press ■ (stop).

To turn off the power, slide the POWER switch up to OFF (CHG), then set the LENS COVER switch to CLOSE.

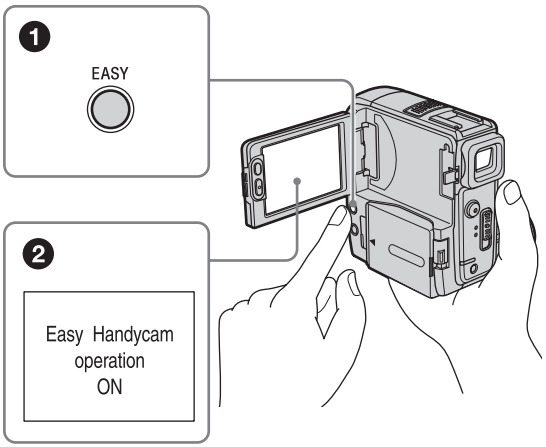


Recording/Playing back with ease

By switching to Easy Handycam operation, recording/playback operation becomes even easier.
Easy Handycam operation allows easy recording/playback for even first time users by providing only the basic functions for recording/playback.

Press EASY when recording/ playing back.

EASY lights up in blue (❶) and the screen font size increases (❷) during Easy Handycam operation.

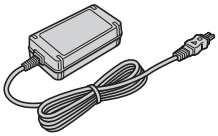


For details, see instructions for each operation.
See page 26 for recording, page 37 for playback.

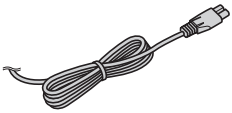
Step 1: Checking supplied items

Make sure you have following items supplied with your camcorder.
The number in parentheses indicates the number of that item supplied.

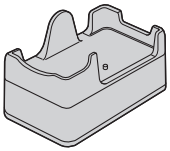
AC Adaptor (1)



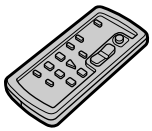
Mains lead (1)



Handycam Station (1)

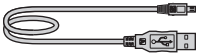


Wireless Remote Commander (1)
A button-type lithium battery is already installed.



A/V connecting cable (1)

USB cable (1)



Rechargeable battery pack NP-FF51 (1)
The silver-colored model of the battery pack NP-FF51 is sold only with the camcorder.

Battery terminal cover (1)
Attached to the camcorder.

CD-ROM “SPVD-012 USB Driver” (1)

Cleaning cloth (1)

21-pin adaptor (1)
For the models with the CE mark printed on their bottom surfaces only.

Camera Operations Guide (This manual) (1)

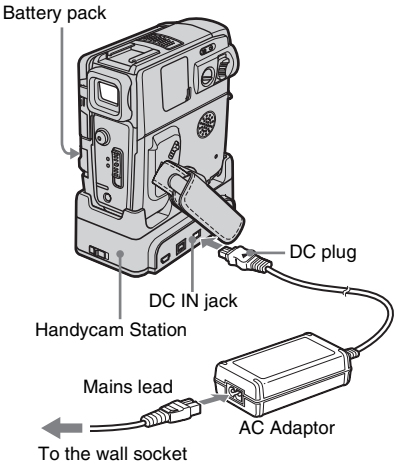
Computer Applications Guide (1)

Step 2: Charging the battery pack

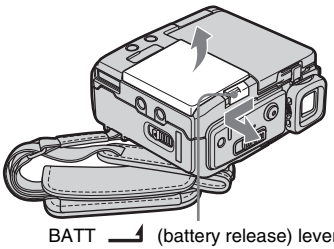
You can charge the battery by attaching the **"InfoLITHIUM" battery pack (F series)** to your camcorder.

Notes

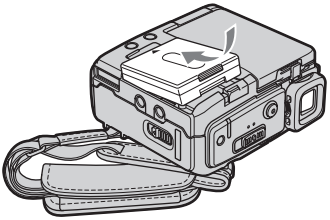
- You cannot use batteries other than the "InfoLITHIUM" battery pack (F series) (p. 85).
- Do not short-circuit the DC plug of the AC Adaptor or battery terminals with any metallic objects. This may cause a malfunction.
- Use a nearby wall socket when using the AC Adaptor. Disconnect the AC Adaptor from the wall socket immediately if any malfunction occurs.



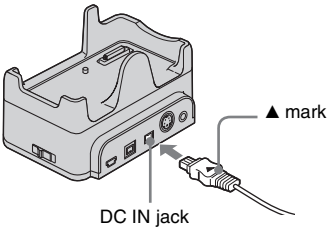
1 **Slide the BATT (battery release) lever and remove the battery terminal cover.**



2 **Attach the battery pack with its terminal side facing your camcorder as shown in the following illustration and press down the battery pack until it clicks.**



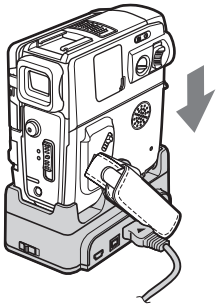
3 **With the ▲ mark on the DC plug facing up, connect the AC Adaptor to the DC IN jack on the Handycam Station.**



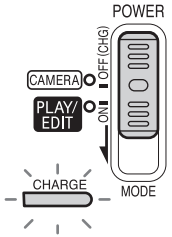
4 **Connect the mains lead to the AC Adaptor.**

5 **Connect the mains lead to the wall socket.**

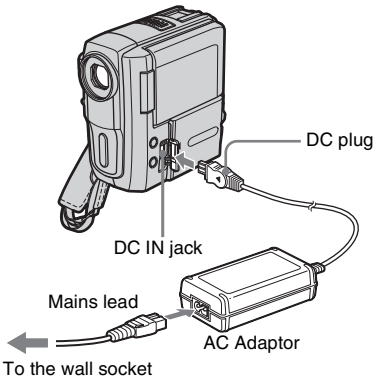
6 **Insert your camcorder into the Handycam Station.**



7 **Set the POWER switch to OFF (CHG).**
The CHARGE lamp lights up and charging starts.



To charge the battery pack using only the AC Adaptor

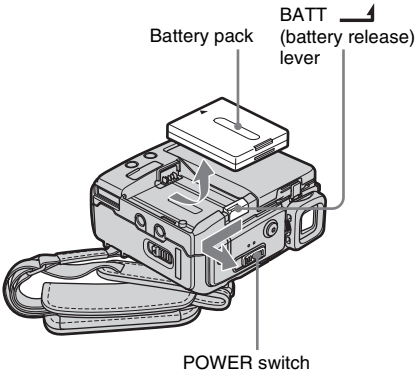


You can charge the battery pack on a trip, even if you have not brought the Handycam Station along. With the ▲ mark on the DC plug facing front, connect the AC Adaptor to the DC IN jack on your camcorder as shown in the illustration.

After charging the battery

The CHARGE lamp turns off when the battery is fully charged. Disconnect the AC Adaptor from the DC IN jack.

To remove the battery pack



1 **Set the POWER switch to OFF (CHG).**

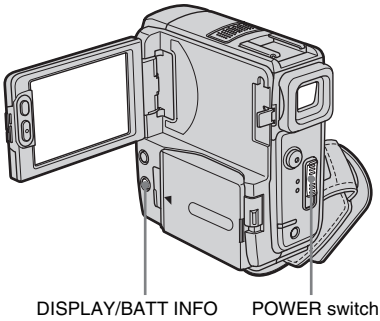
2 **Slide the BATT (battery release) lever in the direction of the arrow as shown in the illustration and remove the battery pack.**

Note

- Always attach the terminal cover to protect the battery terminal. If you do not use the battery pack for a long time, use up the battery pack completely before storing it. See page 86 about storage of the battery pack.

continued

To check the remaining battery – Battery Info

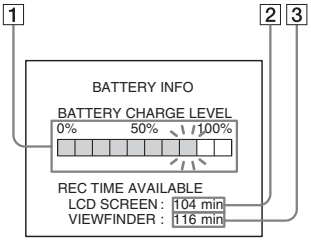


You can check the battery's current charge level and its current remaining recording time both during charging or when the power is turned off.

1 **Set the POWER switch to OFF (CHG).**

2 **Open the LCD panel.**

3 **Press DISPLAY/BATT INFO.**
The battery information appears for about 7 seconds.
Keep the button pressed to view it for about 20 seconds.



1 **Battery charge level: Displays approximate remaining amount of power left in the battery pack.**

2 **Approximate possible recording time using the LCD panel.**

3 **Approximate possible recording time using the viewfinder.**

Charging time

Approximate number of minutes required when you fully charge a fully discharged battery pack at 25°C (77°F). (10 – 30°C (50 – 86°F) recommended.)

Battery pack	
NP-FF50	120
NP-FF51 (supplied)	130
NP-FF70	150
NP-FF71	170

Recording time when recording with the LCD screen on

Approximate number of minutes available when you use a fully charged battery pack at 25°C (77°F).

When LCD BACKLIGHT is set to ON

Battery pack	Continuous recording time	Typical* recording time
NP-FF50	115	60
NP-FF51 (supplied)	130	70
NP-FF70	235	125
NP-FF71	260	140

When LCD BACKLIGHT is set to OFF

Battery pack	Continuous recording time	Typical* recording time
NP-FF50	130	70
NP-FF51 (supplied)	145	75
NP-FF70	270	145
NP-FF71	295	160

Recording time when recording with the viewfinder

Approximate number of minutes available when you use a fully charged battery pack at 25°C (77°F).

Battery pack	Continuous recording time	Typical* recording time
NP-FF50	130	70
NP-FF51 (supplied)	145	75
NP-FF70	270	145
NP-FF71	295	160

* Approximate number of minutes when recording while you repeatedly record, start/stop, slide the POWER switch to change the power mode, and zoom. The actual battery life may be shorter.

Playing time

Approximate number of minutes available when you use a fully charged battery pack at 25°C (77°F).

Battery pack	LCD panel opened*	LCD panel closed
NP-FF50	130	150
NP-FF51 (supplied)	145	170
NP-FF70	270	315
NP-FF71	295	345

* With LCD BACKLIGHT set to ON.

Notes

- The power will not be supplied from the battery pack when the AC Adaptor is connected to the DC IN jack of your camcorder or the Handycam Station, even if its mains lead is disconnected from the wall socket.
- The recording and playback time will be shorter when you use your camcorder in low temperature.
- The CHARGE lamp flashes during charging, or the battery information will not be correctly displayed in following conditions.
  – The battery pack is not attached correctly.
  – The battery pack is damaged.
  – The battery pack is fully discharged. (For Battery information only)
- With a large capacity battery pack (NP-FF70/FF71) installed, your camcorder will be less balanced-support it properly when placing your camcorder on a table etc., in this case.

Using an outside power source

You can use the AC Adaptor as the power source when you do not want the battery to run out. While you are using the AC Adaptor, the battery pack will not lose its charge even when it is attached to your camcorder.

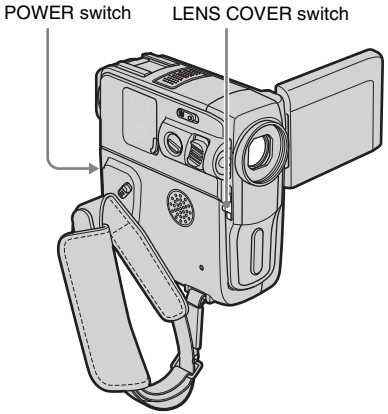
PRECAUTION

Even if your camcorder is turned off, the AC power (mains) is still supplied to it while connected to the wall socket via the AC Adaptor.

Connect your camcorder as shown in “Charging the battery pack” (p. 12).

Step 3: Turning the power on

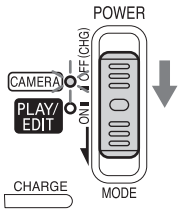
You need to slide the POWER switch repeatedly to select the desired power mode to record or play.
When using this camcorder for the first time, the CLOCK SET screen appears (p. 18).



1 Set the LENS COVER switch to OPEN.

2 While pressing the green button, slide the POWER switch down.

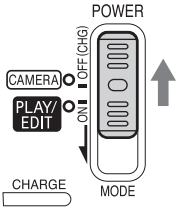
The power turns on.
To enter the recording or playing mode, slide the switch repeatedly until the respective lamp for the desired power mode lights up.



• CAMERA: To record on a tape.
• PLAY/EDIT: To play or edit pictures.

To turn off the power

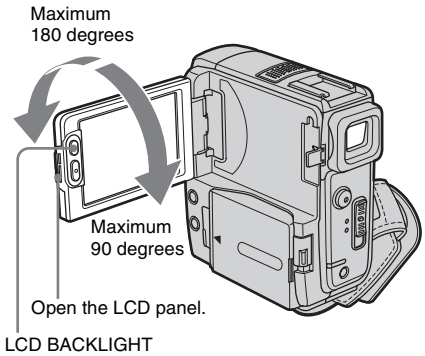
Slide the POWER switch up to OFF (CHG), then set the LENS COVER switch to CLOSE.



Step 4: Adjusting the LCD panel and viewfinder

Adjusting the LCD panel

You can adjust the angle and brightness of the LCD panel to meet various recording situations.
Even when there are obstructions between you and the subject, you can check the subject on the LCD screen during recording by adjusting the angle of the LCD panel.



Open the LCD panel 90 degrees to the camcorder, then rotate it to the desired position.

To adjust the brightness of the LCD screen

1 **When the POWER switch is set to the CAMERA mode, touch FN and select PAGE2.**
When the POWER switch is set to the PLAY/EDIT mode, touch FN to display PAGE1.

2 **Touch LCD BRT.**

3 **Adjust the brightness with −/+, then touch OK.**

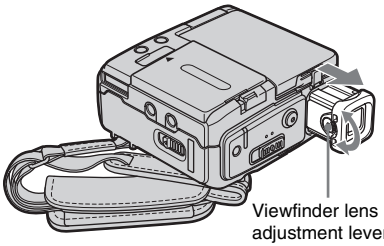
4 **Touch ×.**

Tips

- If you rotate the LCD panel 180 degrees to the lens side, you can close the LCD panel with the LCD screen facing out.
- If you are using the battery pack for power source, you can adjust the brightness by selecting [LCD B.L.] on the (LCD/VF SET) menu (p. 51).
- When you use your camcorder in bright conditions, set LCD BACKLIGHT to turn off the backlight for the LCD panel. OFF appears and this setting saves battery power.
- Even if you adjust the LCD screen backlight, the recorded picture will not be affected.
- You can turn off the confirmation beep sound for operation on the touch panel when you set [BEEP] to [OFF] on the ETC (OTHERS) menu (p. 60).

Adjusting the viewfinder

You can view images using the viewfinder when you close the LCD panel. Use the viewfinder when the battery is running out, or when the screen is hard to see.



1 **Extend the viewfinder until it clicks.**

2 **Adjust the viewfinder lens adjustment lever until the picture is clear.**

To use the viewfinder during operation

When you are recording, you can adjust the exposure (p. 29) and fader (p. 32) while checking the image on the viewfinder. Have the

➡*continued*

LCD panel rotated 180 degrees and closed with the screen facing out.

1 Slide the POWER switch to select the CAMERA mode. (p. 16)

2 Extend the viewfinder, and close the LCD panel with the screen facing out.
OFF appears on the screen.

3 Touch OFF.

4 Touch OK.
The LCD screen is turned off.

5 Touch the LCD screen while checking the display in the viewfinder.
EXPOSURE, etc. are displayed.

6 Touch the button you want to set.
- EXPOSURE: Adjust with − / + and touch ↩OK .
- FADER: Touch it repeatedly to select a desired effect.
- ON: The LCD screen lights up.

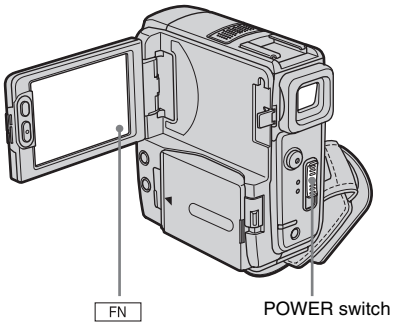
To hide the buttons on the LCD screen, touch ↩OK .

Tip
- To adjust the brightness of the viewfinder backlight, select (LCD/VF SET), then [VF B.L.] (when you are using the battery pack, p. 51).

Step 5: Setting the date and time

Set the date and time when using this camcorder for the first time. If you do not set the date and time, the CLOCK SET screen appears every time you turn on your camcorder.

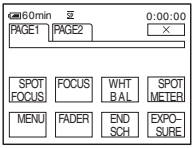
Note
- If you do not use your camcorder for about **3 months**, the built-in rechargeable button-type battery gets discharged and the date and time settings may be cleared from the memory. In that case, charge the rechargeable button-type battery (p. 89) and then set the date and time again.



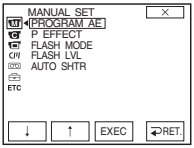
1 Turn on your camcorder (p. 16).

2 Open the LCD panel.
Proceed to step 7 when you set the clock for the first time.

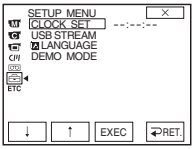
3 **Touch [FN] to display PAGE1.**



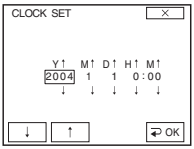
4 **Touch MENU.**



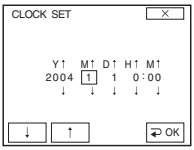
5 **Select (SETUP MENU) with [↓] / [↑], then touch EXEC.**



6 **Select CLOCK SET with [↓] / [↑], then touch EXEC.**



7 **Set Y (year) with [↓] / [↑], then touch [OK].**



You can set any year up to the year 2079.

8 **Set M (month), D (day), H (hour) and M (minute) in the same way as was done in step 7, then touch [OK].**

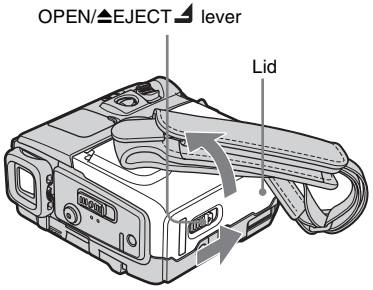
Step 6: Inserting a cassette tape

You can use mini DV Mini DV cassettes only. For details on these cassettes (such as write-protection), see page 83.

Note

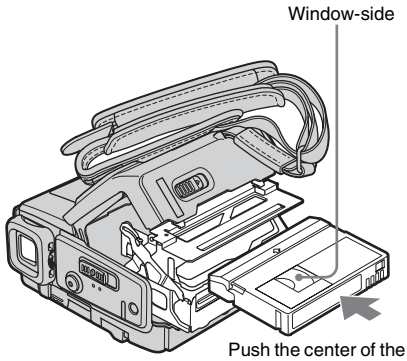
- Do not force the cassette into the compartment. This may cause a malfunction of your camcorder.

1 Slide the OPEN/⏏EJECT lever in the direction of the arrow and open the lid.



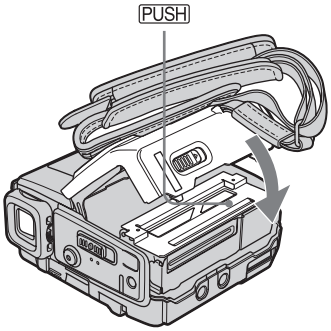
The cassette compartment automatically comes out and opens up.

2 Insert a cassette with its window-side facing up.



3 Press PUSH.

The cassette compartment automatically slides back in.



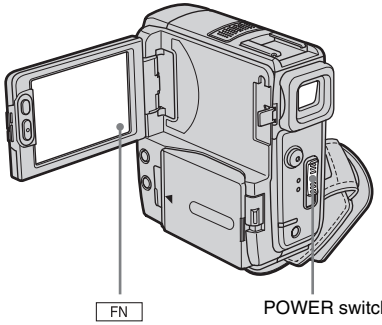
4 Close the lid.

To eject the cassette

1. **Slide the OPEN/⏏EJECT lever in the direction of the arrow and open the lid.** The cassette compartment automatically comes out.
2. **Take out the cassette, then press PUSH.** The cassette compartment automatically slides back in.
3. **Close the lid.**

Step 7: Setting the screen language

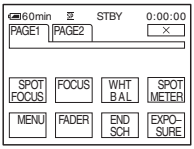
You can select the language to be used on the LCD screen.



1 **Turn on your camcorder.**

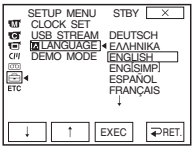
2 **Open the LCD panel.**

3 **Touch FN to display PAGE1.**



4 **Touch MENU.**

5 **Select (SETUP MENU), then select LANGUAGE with ↓ / ↑, then touch EXEC.**



6 **Select the desired language with ↓ / ↑, then touch EXEC.**

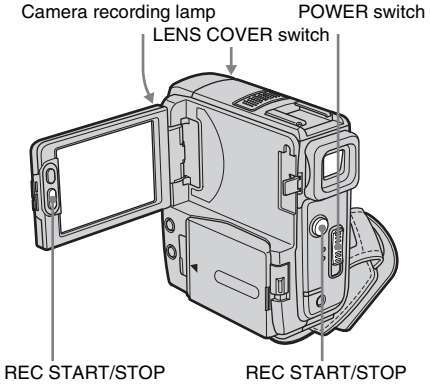
7 **Touch ×.**

Tip

- Your camcorder offers [ENG[SIMP]] (Simplified English) for when you cannot find your native tongue among the options.

Recording movies

Before recording, follow steps 1 to 7 in "Getting started" (p. 11 - p. 21).
When you are recording, movies will be recorded along with stereo sound.



Tip

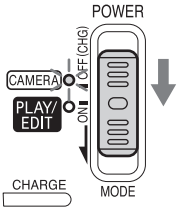
- Performing Easy Handycam operation, even first time users can record easily. For details, see page 26.

1 Set the LENS COVER switch to OPEN.

2 Open the LCD panel.

3 Slide the POWER switch until the CAMERA lamp lights up.

Your camcorder is set to the standby mode.



Slide the POWER switch while pressing the green button.

4 Press REC START/STOP.

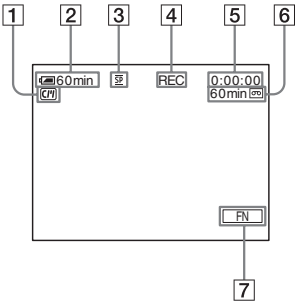
Recording starts. [REC] appears on the LCD screen and the Camera recording lamp lights up.
Press REC START/STOP again to stop recording.

To turn the power off

Slide the POWER switch up to OFF (CHG), then set the LENS COVER switch to CLOSE.

Indicators displayed during recording

The indicators will not be recorded on the tape. Date/time and the camera settings data (p. 38) will not be displayed during recording.



1 Indicators for Cassette Memory cassettes

2 Remaining battery
The indicated time may not be correct depending on the environment of use.
When you opened or closed the LCD panel, it takes about 1 minute to display the correct remaining battery time.

3 Recording mode (SP or LP)

4 Recording status ([STBY] (standby) or [REC] (recording))

5 Tape photo recording/Time code or tape counter (hour: minute: second)

6 Recording capacity of the tape (p. 55)

7 Function button

Notes

- Before changing the battery pack, slide the POWER switch up to OFF (CHG).
- In the default setting, when you do not operate the camcorder for more than about 5 minutes, the power will automatically turn off to prevent battery loss ([A.SHUT OFF], p. 60). To restart recording, slide

the POWER switch until the CAMERA lamp lights up, and then press REC START/STOP.

Tips

- If you do not use your camcorder for a long time, remove the cassette and store it.
- You can also record movies by pressing REC START/STOP beside the LCD screen. It is useful for recording from a low angle or recording yourself in mirror mode.
- To press REC START/STOP beside the LCD screen, support the LCD panel with your hand.
- If you install a large capacity battery pack (NP-FF70/FF71) on your camcorder, we recommend recording with the LCD screen.
- To ensure smooth transition on a tape from the last recorded scene to the next, note the following.
  – Do not remove the cassette. (The picture will be recorded continuously without a break even when you turn the power off.)
  – Do not record pictures in SP mode and LP mode on the same tape.
  – Avoid stopping then recording a movie in the LP mode.
- The recording time, date, and the camera settings data are recorded automatically on the tape without being displayed on the screen. You can view this information during playback if you set [DATA CODE] on the screen (p. 38).

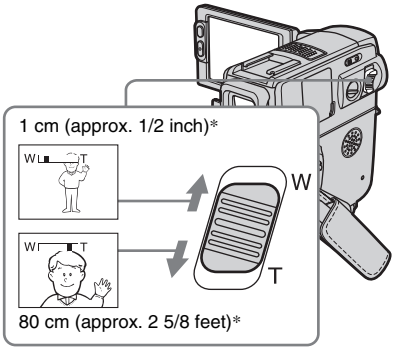
Recording for a longer time

To record for a longer time

In the (TAPE SET) menu, select [REC MODE], then [LP] (p. 55).
In the LP mode, you can record 1.5 times longer than you can when recording in the SP mode. A tape recorded in the LP mode should be played back only on this camcorder.

Using zoom

You can choose zoom to magnification levels greater than 10 times, and from that point activate the digital zoom ([D ZOOM], p. 48). Occasional use of the zoom is effective, but use it sparingly for best results.



* The minimum distance required between your camcorder and the subject to get a sharp focus in that position of the lever.

Move the power zoom lever slightly for a slower zoom. Move it further for a faster zoom.

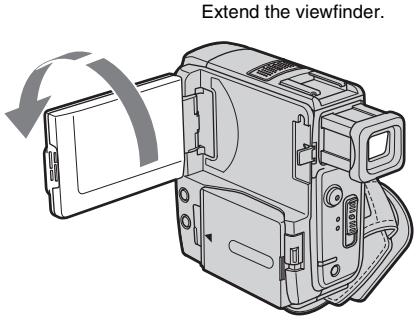
To record wider range of view
Move the power zoom lever towards W. The subject appears farther away (Wide angle).

To record closer view
Move the power zoom lever towards T. The subject appears closer (Telephoto).

Recording in mirror mode

You can turn the LCD panel towards the subject so that you and your subject can share the image being recorded. You can also utilize this function when recording yourself, to keep the attention of small children attracted to the camcorder while you record them.

➡ *continued*

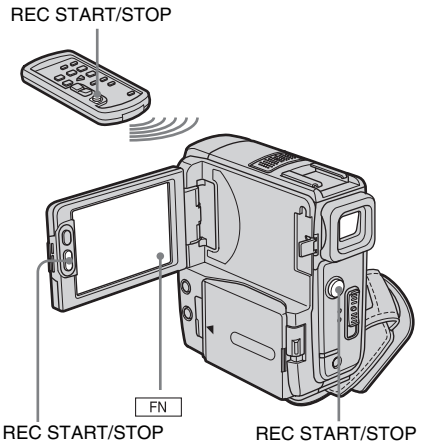


Open the LCD panel 90 degrees to the camcorder, then rotate it 180 degrees towards the subject.

A mirror-image of the subject appears on the LCD screen, but the picture will be normal when recorded.

Using the self-timer

With the self-timer, you can start recording after a delay of about 10 seconds.

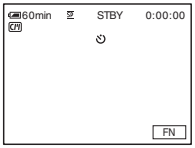


1 **Touch FN and select [PAGE2].**

2 **Touch [SELF TIMER].**

3 **Touch .**

appears.



4 **Press REC START/STOP.**

You will hear a beep sound counting down for about 10 seconds.
The recording starts.
To stop recording, press REC START/STOP.

To cancel the count down

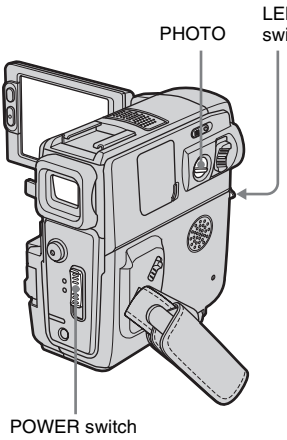
Press REC START/STOP.

To cancel the self-timer

Follow steps 1 and 2.

Recording still images – Tape photo recording

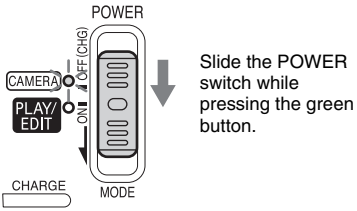
You can record still images. Before recording, follow steps 1 to 7 in “Getting started” (p. 11 - p. 21).



1 **Set the LENS COVER switch to OPEN.**

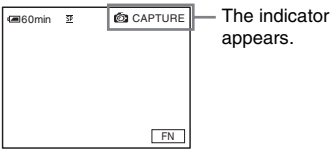
2 **Open the LCD panel.**

3 **Slide the POWER switch until the CAMERA lamp lights up.**



4 **Press and hold PHOTO lightly.**

You will hear a light beep sound and the picture becomes a still image. Recording does not start at this point.



5 **Press PHOTO fully.**

A shutter sound is heard, and the image is recorded with sound for 7 seconds.
The still image is displayed on the screen until recording is completed.

To turn the power off

Slide the POWER switch up to OFF (CHG), then set the LENS COVER switch to CLOSE.

Note

- appears when the tape photo recording does not work.

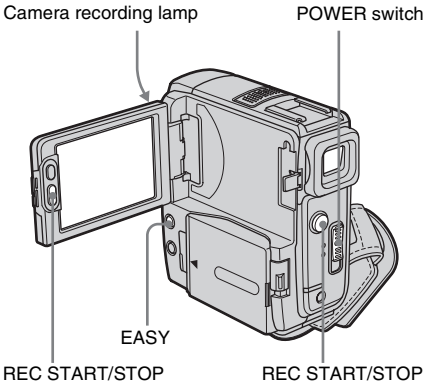
Tips

- You can record about 510 images in the SP mode and about 765 images in the LP mode on a 60 minutes tape.
- You can record still images using the self-timer recording (p. 24).

Recording with ease

– Easy Handycam

With this Easy Handycam operation, most of the camera settings are set to the automatic mode, only basic functions become available, and the screen font size increases for easy viewing. Even first time users can enjoy easy recording. Before recording, follow steps 1 to 7 in “Getting started” (p. 11 - p. 21).



Tip

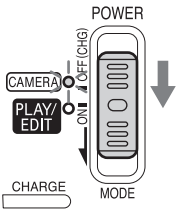
- When you touch MENU during Easy Handycam operation, only the available functions are displayed on the screen.

1 **Set the LENS COVER switch to OPEN.**

2 **Open the LCD panel.**

3 **Slide the POWER switch to select the CAMERA mode.**

You can record only movies.



Slide the POWER switch while pressing the green button.

4 **Press EASY.**

EASY lights up in blue.

5 **Press REC START/STOP.**

Recording starts. [REC] appears on the LCD screen and the Camera recording lamp lights up. Press REC START/STOP again to stop recording.

To turn the power off

Slide the POWER switch up to OFF (CHG), then set the LENS COVER switch to CLOSE.

To cancel Easy Handycam operation

Press EASY again.

Notes

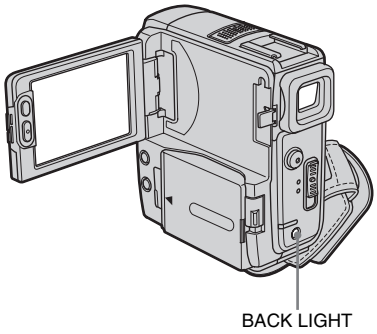
- You cannot switch from/to Easy Handycam operation during recording.
- During Easy Handycam operation, you cannot connect the USB cable to your camcorder.
- You cannot use Easy Handycam operation together with USB Streaming.
- During Easy Handycam operation, the following buttons are not available:
  – LCD BACKLIGHT (p. 17)
  – BACK LIGHT (p. 27)
- All the settings return to their defaults during Easy Handycam operation. Previously made settings are restored when you exit Easy Handycam operation.

Adjusting the exposure

The exposure is adjusted automatically in the default setting.

Adjusting the exposure for backlit subjects

When your subject has its back to the sun or other light, you can adjust the exposure to prevent the subject from becoming shadowed.



Press BACK LIGHT when the POWER switch is set to the CAMERA mode.

appears.
To cancel the back light function, press BACK LIGHT again.

Note

- The back light function is canceled when you set [EXPOSURE] to [MANUAL] (p. 29) or select [SPOT METER] (p. 27).

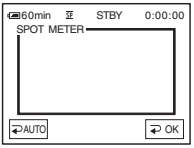
Fixing the exposure for the selected subject – Flexible spot meter

You can adjust and fix the exposure to the subject, so that it is recorded in suitable brightness even when there is strong contrast between the subject and the background (such as subjects in the limelight on stage).

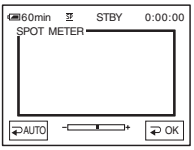
1 **Slide the POWER switch to select the CAMERA mode.**

2 **Touch [FN] to display [PAGE1].**

3 **Touch [SPOT METER].**



4 **Touch the point you want to adjust and fix the exposure on the screen.**
[SPOT METER] flashes while the camera is adjusting the exposure for the selected point.



5 **Touch [OK].**

6 **Touch [×].**

➡ *continued*

To return the setting to automatic exposure

Follow steps 1 to 3, then touch [AUTO] in step 4. Or set [EXPOSURE] to [AUTO] (p. 29).

Notes

- You cannot use the Flexible spot meter together with the NightShot plus function.
- If you set [PROGRAM AE], [SPOT METER] is automatically set to [AUTO].

Tip

- If you set [SPOT METER], [EXPOSURE] is automatically set to [MANUAL].

Adjusting the white balance manually

You can adjust the color balance to the brightness of the recording environment. The indicators in parentheses appear when the setting is selected.

[AUTO]
Select when you want to record with the white balance adjusted automatically.

[OUTDOOR] ( )
Select when recording a sunset/sunrise, general night views, neon signs, fireworks, or when under daylight fluorescent lamps.

[INDOOR] ( )
Select when recording at a party or in studios where lighting conditions change quickly. And also, select when under video lamps such as those in a studio, under sodium lamps, mercury lamps or warm white fluorescent lamps.

[ONE PUSH] ( )
Select when you want to record with the white balance adjusted depending on the light source.

1 Slide the POWER switch to select the CAMERA mode.

2 Touch FN to display [PAGE1].

3 Touch [WHT BAL].

4 Touch the desired effect.
When you touch [ONE PUSH]

1 Frame a white object such as a piece of paper filling the screen under the same lighting conditions as you will shoot the subject.
2 Touch .
flashes quickly.
When the white balance has been adjusted and stored in the memory, the indicator stops flashing.

5 Touch OK.

6 Touch .

Notes

- You cannot use the white balance together with the NightShot plus function.
- The setting returns to [AUTO] when you disconnect the power source from your camcorder for more than 5 minutes.
- Do not shake or strike the camcorder while flashes quickly.
- When flashes slowly, the white balance is not set or was not able to be set.
- If keeps flashing even when you touch OK, set [WHT BAL] to [AUTO].

Tips

- For better color balance adjustment when [WHT BAL] is set to [AUTO], aim your camcorder at a nearby white object for about 10 seconds after setting the POWER switch to CAMERA when:
  – You remove the battery pack for replacement.
  – You bring your camcorder outdoors from inside the house while using fixed exposure, or bring your camcorder in from outside.
- Redo the [ONE PUSH] procedure when:
  – You changed the [PROGRAM AE] settings when [WHT BAL] is set to [ONE PUSH].
  – You brought your camcorder outdoors from inside the house, or vice versa.
- Set [WHT BAL] to [AUTO] or [ONE PUSH] under white or cool white fluorescent lamps.

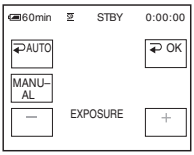
Adjusting the exposure manually

You can fix the brightness of a picture at the best exposure. When recording indoors on a clear day, for instance, you can avoid backlight shadows on people next to the window by manually fixing the exposure to that of the wall side of the room.

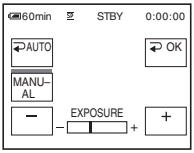
1 Slide the POWER switch to select the CAMERA mode.

2 Touch [FN] to display [PAGE1].

3 Touch [EXPOSURE].

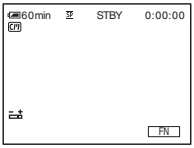


4 Touch [MANUAL].



5 Adjust the exposure by touching [−] (dim)/ [+] (bright), then touch [OK].

6 Touch [×].



To return the setting to automatic exposure

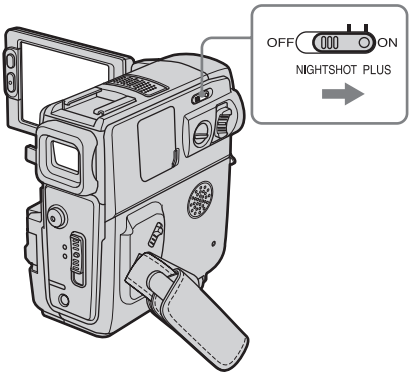
Follow steps 1 to 3, then select [AUTO] in step 4.

Note

- You cannot use the manual exposure together with the NightShot plus function.

Recording in dark places – NightShot plus

You can record subjects in dark places (such as when capturing the face of your baby sleeping) with this function.



Set the NIGHTSHOT PLUS switch to ON.

(eye) and "NIGHTSHOT PLUS" appear.

To cancel NightShot plus, set the NIGHTSHOT PLUS switch to OFF.

Notes

- Do not use the NightShot plus function in bright places. This may cause a malfunction.
- You cannot use the NightShot plus function together with:
  - [PROGRAM AE]
  - Manual exposure
  - Flexible spot meter
  - White balance
- Adjust the focus manually when it is hard to focus automatically.
- Do not cover the infrared port with your fingers or other objects. Remove the conversion lens (optional) if it is attached.
- Depending on the shooting conditions or circumstances, colors may not be reproduced properly.

Tip

- If you record subjects in complete darkness, set [N.S.LIGHT] to [ON] in the menu setting. The maximum shooting distance using the NightShot Light is about 3 meters (10 feet). If you record subjects in dark places (such as night scene or in moonlight), set [N.S.LIGHT] to [OFF] in the menu setting. You can make image color deeper (p. 49).

Adjusting the focus

The focus is adjusted automatically in the default setting.

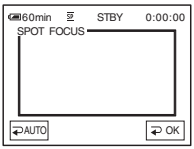
Adjusting the focus for an off-center subject – SPOT FOCUS

You can select and adjust the focal point to aim it at a subject not located in the center of the screen.

1 Slide the POWER switch to select the CAMERA mode.

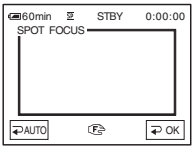
2 Touch [FN] to display [PAGE1].

3 Touch [SPOT FOCUS].



4 Touch the subject for which you want to adjust the focus on the screen.

[SPOT FOCUS] flashes while the camera is adjusting the focus.
appears.



5 Touch [OK].

6 Touch [×].

To adjust the focus automatically

Follow steps 1 to 3, then touch [AUTO] in step 4. Or, set [FOCUS] to [AUTO] (p. 31).

Note

- You cannot use the SPOT FOCUS function together with [PROGRAM AE].

Tip

- If you set [SPOT FOCUS], [FOCUS] is automatically set to [MANUAL].

Adjusting the focus manually

You can adjust the focus manually according to the recording conditions.
Use this function in the following cases.

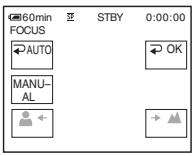
– To record a subject behind a window covered with raindrops.
– To record horizontal stripes.
– To record a subject with little contrast between the subject and its background.
– When you want to focus on a subject in the background.

– To record a stationary subject using a tripod.

1 Slide the POWER switch to select the CAMERA mode.

2 Touch [FN] to display [PAGE1].

3 Touch [FOCUS].



➡ *continued*

4 **Touch [MANUAL].**

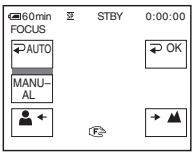
☞ appears.

5 **Touch [ ] or [ ] to adjust the focus.**

[ ] : To focus on close subjects.

[ ] : To focus on distant subjects.

☞ changes to ▲ when the focus cannot be adjusted any further. ☞ changes to 👤 when the focus cannot be adjusted any closer.



Tips for focusing manually

- It is easier to focus on the subject when you use the zoom function. Move the power zoom lever towards T (telephoto) to adjust the focus, and then, towards W (wide angle) to adjust the zoom for recording.
- When you want to record a close-up image of a subject, move the power zoom lever towards W (wide angle) to fully magnify the image, then adjust the focus.

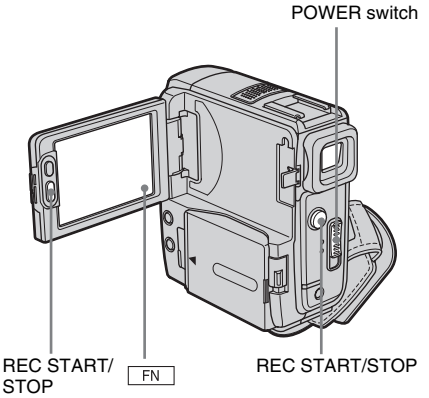
6 **Touch [OK].**

7 **Touch [ ].**

To adjust the focus automatically

Follow steps 1 to 3, then touch [AUTO] in step 4.

Recording a picture using various effects



Fading in and out of a scene – FADER

You can add the following effects to currently recording pictures.

[BLACK] (black fader)

[WHITE] (white fader)

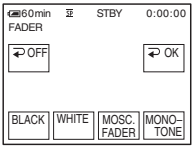
[MOSC. FADER] (mosaic fader)

[MONOTONE]
When fading in, the picture gradually changes from black-and-white to color.
When fading out, the picture gradually changes from color to black-and-white.

1 **Slide the POWER switch to select the CAMERA mode.**

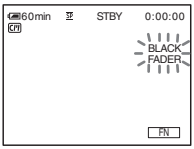
2 **Touch FN to display [PAGE1] in the standby mode (to fade in) or during recording (to fade out).**

3 **Touch [FADER].**



4 **Touch the desired effect, then touch OK.**

5 **Touch ×.**

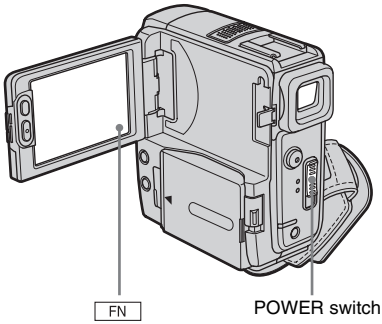


6 **Press REC START/STOP.**
The fader indicator stops flashing and disappears when the fade is complete.

To cancel the operation
In step 3, touch [OFF].

Note
- You cannot use the FADER function together with:
  – Tape photo recording
  – [FRAME REC] (Frame recording)
  – [INT.REC] (Interval recording)

Searching for the starting point



Searching for the last scene of the most recent recording – END SEARCH

This function is handy when you have played back the tape, for example, but want to start recording right after the most recently recorded scene. When you use a cassette without Cassette Memory, the END SEARCH function will not work once you eject the cassette after you have recorded on the tape. If you use a cassette with Cassette Memory, it will function even when you have ejected the cassette.

1 **Slide the POWER switch to select the CAMERA mode.**

2 **Touch FN to display [PAGE1].**

3 **Touch [END SCH].**
The last scene of the most recent recording is played back for about 5 seconds, and the camcorder enters the standby mode at the point where the last recording has finished.

continued

4 **Touch [×].**

To cancel the operation

Touch [END SCH] again.

Note

- The END SEARCH function will not work correctly when there is a blank section between recorded sections on the tape.

Tip

- When the PLAY/EDIT mode is selected, you can do this operation.

Searching manually – EDIT SEARCH

You can search for the start point while viewing the pictures on the screen. The sound is not played back during the search.

1 **Slide the POWER switch to select the CAMERA mode.**

2 **Touch [FN] to display [PAGE1].**

3 **Touch MENU.**

4 **Select [C] (CAMERA SET), then select [EDITSEARCH] with [↓] / [↑], then touch [EXEC].**

5 **Select [ON], then touch [EXEC].**

6 **Touch [×].**

7 **Keep touching [⏮/−] (to go backward)/[+] (to go forward) and release it at the point where you want to start recording.**

Reviewing the most recently recorded scenes – Rec review

You can view a few seconds of the scene recorded just before you stopped the tape.

1 **Slide the POWER switch to select the CAMERA mode.**

2 **Touch [FN] to display [PAGE1].**

3 **Touch MENU.**

4 **Select [C] (CAMERA SET), then select [EDITSEARCH] with [↓] / [↑], then touch [EXEC].**

5 **Select [ON], then touch [EXEC].**

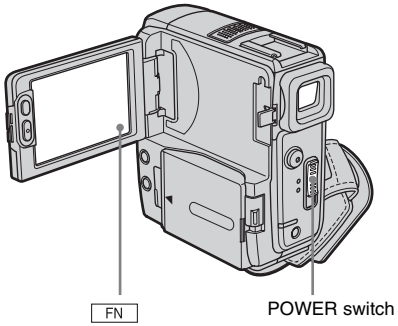
6 **Touch [×].**

7 **Touch [⏮/−] once.**

The last few seconds of the most recently recorded scene are played back. Then, your camcorder is set to the standby mode.

Viewing pictures recorded on a tape

Make sure you have a recorded tape inserted into your camcorder.
When you want to play back recordings on your TV, see page 40.
You can control playback using the Remote Commander.

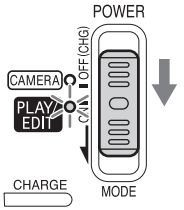


Tip

- Performing Easy Handycam operation, even first time users can play back easily. For details, see page 37.

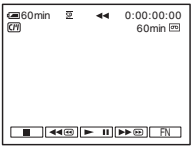
1 **Open the LCD panel.**

2 **Slide the POWER switch repeatedly until the PLAY/EDIT lamp lights up.**



Slide the POWER switch while pressing the green button.

3 **Touch ◀◀ (rewind) to go to the point you want to view.**



4 **Touch ▶II (play) to start playback.**

To adjust the volume

1. **Touch FN to display [PAGE1].**
2. **Touch [VOL].**
3. **Adjust the volume by touching − (decrease) / + (increase), then touch OK.**
4. **Touch ×.**

To stop playback

Touch ■ (stop).

To pause

Touch ▶II (pause) during playback. Touch it again to restart the playback.
Playback stops automatically when the pause mode continues for more than 5 minutes.

To fast forward or rewind

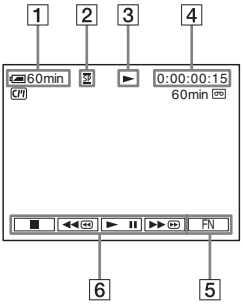
Touch ▶▶ (fast forward) or ◀◀ (rewind) in stop mode.

To review movies on the viewfinder

Close the LCD panel. Then, extend the viewfinder.

➡*continued*

Indicators displayed during playback



1 **Remaining battery time**

2 **Recording mode (SP or LP)**

3 **Tape transport indicator**

4 **Time code (hour: minute: second: frame) or tape counter (hour: minute: second)**

5 **Function button**

6 **Video operation buttons**

Playing back in various modes

To fast forward or rewind during playback – Picture search

Keep touching ▶▶ (fast forward) or ◀◀ (rewind) during playback.
To resume normal playback, release the button.

To view the picture while fast forwarding or rewinding – Skip scan

Keep touching ▶▶ (fast forward) or ◀◀ (rewind) while fast forwarding or rewinding the tape.
To resume fast forwarding or rewinding, release the button.

To play back in various modes

You will not hear the recorded sound. Also, you may see mosaic-like images of the previously played picture remaining on the screen.

1 Touch FN and select [PAGE3] during playback or playback pause.

2 Touch [V SPD PLAY].

3 Select a playback mode.
To return to the normal playback mode, touch ▶II (play/pause) twice (once from frame playback).

To	Touch
change the playback direction*	◀II< (frame) during playback.
play back slowly**	[▮► SLOW] during playback. To reverse direction ❶ Touch ◀II< (frame). ❷ [▮► SLOW].
play back 2 times faster (double speed)	×2 (double speed) during playback. To reverse direction ❶ Touch ◀II< (frame). ❷ ×2 (double speed).
play back frame by frame	>II▶ (frame) during playback pause. To reverse direction, touch ◀II< (frame) again during frame playback.

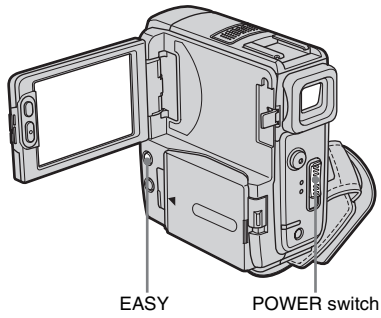
*Horizontal lines may appear at the top, bottom, or in the center of the screen. This is not a malfunction.

**Pictures output from the i.LINK DV Interface cannot be played back smoothly in slow mode.

4 Touch [RET.], then ×.

Playing back with ease – Easy Handycam

Easy Handycam operation allows easy playback for even first time users by providing only the basic functions for playback. Also, the screen font size increases for easy viewing. Make sure you have a recorded tape inserted into your camcorder.

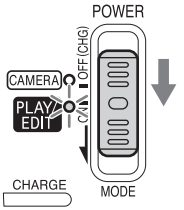


Tip

- When you touch FN and MENU during Easy Handycam operation, only the available functions are displayed on the screen.

1 Open the LCD panel.

2 Slide the POWER switch repeatedly to select the PLAY/EDIT mode.



Slide the POWER switch while pressing the green button.

3 Press EASY.

EASY lights up in blue.

Easy Handycam operation ON

4 Play back a tape.

The following buttons can be operated.
▶II (play/pause)/ ▶▶ (fast forward)/ ■ (stop)/ ◀◀ (rewind)
You can operate these operations and SLOW ▮▶ on the Remote Commander.

To cancel Easy Handycam operation

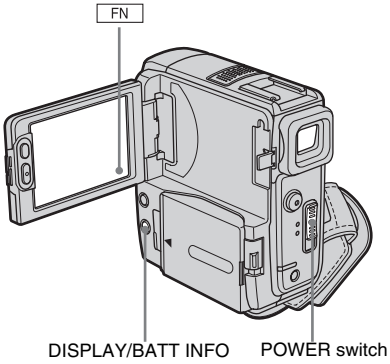
Press EASY again.

Notes

- During Easy Handycam operation, you cannot connect the USB cable to your camcorder.
- You cannot use Easy Handycam operation together with USB Streaming.

Various playback functions

You can display the recorded date and camera setting data.



Displaying the screen indicators

You can choose to display the time code, tape counter, and other information on the screen.

Press DISPLAY/BATT INFO.

The indicators appear/disappear as you press the button.

Tips

- You can display the screen indicators by pressing DISPLAY on the Remote Commander.
- You can display the screen indicators during playback on a TV. Select ETC (OTHERS), [DISPLAY], then [V-OUT/LCD] (p. 61).

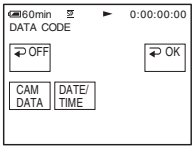
Displaying the date/time and camera settings data – Data code

During playback, you can view the date/time data ([DATE/TIME]) and the camera settings data ([CAM DATA]) that are automatically recorded while recording pictures on a tape.

1 Slide the POWER switch repeatedly to select the PLAY/EDIT mode.

2 Touch FN and select [PAGE2] during playback or playback pause.

3 Touch [DATA CODE].



4 Select [CAM DATA] or [DATE/TIME], then touch OK .

5 Touch ✕ .

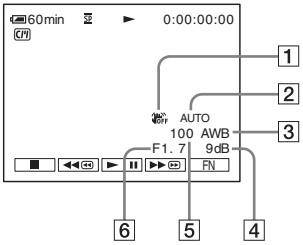
To hide the date/time or the camera settings data

Follow steps 2 and 3, and select [OFF] in step 4.

Camera settings data display

In the date/time data display, the date and time is displayed in the same area.

If you record the picture without setting the clock, [-- -- ----] and [--:--:--] will appear.



1 SteadyShot off

2 Exposure

3 White balance

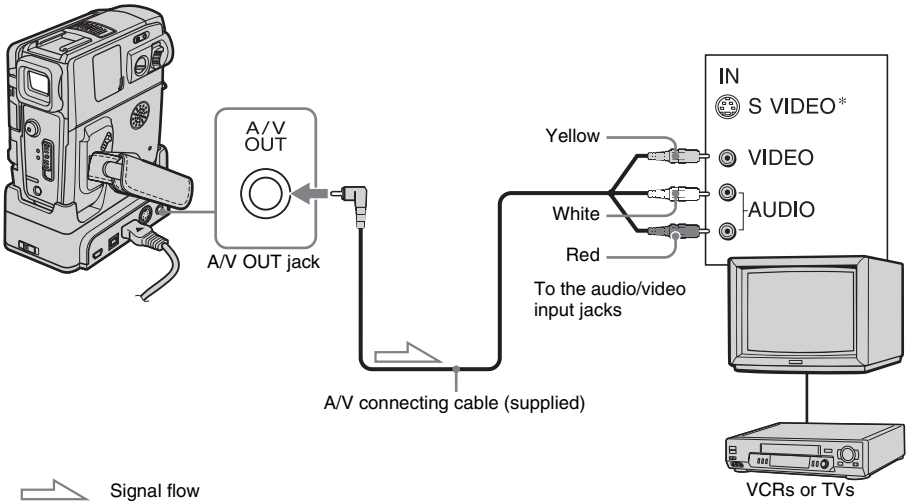
4 Gain

5 Shutter speed

6 Aperture value

Playing the picture on a TV

Connect your camcorder via the Handycam Station or the A/V OUT jack of your camcorder to a TV using the supplied A/V connecting cable.
Connect the supplied AC Adaptor to the wall socket for the power supply (p. 15).
Refer also to the instruction manuals supplied with the devices to be connected.
To copy to another tape, see page 63.



* By using an S video cable (optional), higher quality DV format pictures can be produced. When there is an S video jack on the device to be connected, connecting the S video cable (optional) to the S video jacks on both the Handycam Station and the device instead of using the yellow plug is recommended. The audio will not be output when you connect with the S video plug alone.

When your TV is connected to a VCR

Connect your camcorder to the LINE IN input on the VCR using the A/V connecting cable. Set the input selector on the VCR to LINE.

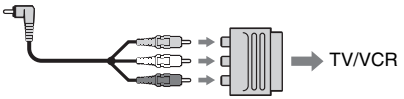
When your TV is monaural (When your TV has only one audio input jack)

Connect the yellow plug of the A/V connecting cable to the video input jack and connect the white or the red plug to the audio input jack of your TV or VCR.

When you want to play the sound in monaural mode, use a connecting cable (optional) for that purpose.

If your TV/VCR has a 21-pin connector (EUROCONNECTOR)

Use the 21-pin adaptor supplied with your camcorder (For models with the CE mark printed on their bottom surfaces only). This adaptor is designed for output use only.

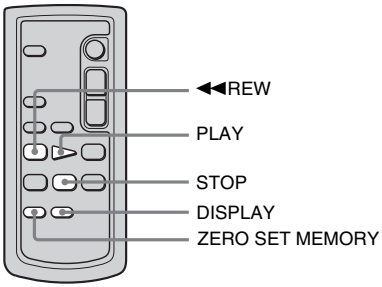


Note

- Do not connect the A/V connecting cables to both your camcorder and the Handycam Station. The recorded picture may be distorted.

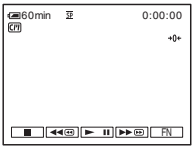
Locating a scene on a tape for playback

Searching quickly for a desired scene – Zero set memory



1 During playback, press ZERO SET MEMORY on the Remote Commander at the point you want to locate later on.

The tape counter is reset to "0:00:00" and →0← appears on the screen.



If the tape counter is not displayed, press DISPLAY on the Remote Commander.

2 Press STOP when you want to stop playback.

3 Press ◀◀REW.

The tape stops automatically when the tape counter reaches "0:00:00."

4 Press PLAY.

The playback starts from the point designated "0:00:00" on the tape counter.

To cancel the operation

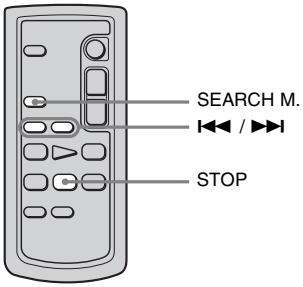
Press ZERO SET MEMORY on the Remote Commander again.

Notes

- There may be a discrepancy of several seconds between the time code and the tape counter.
- Zero set memory will not function correctly if there is a blank section between recorded sections on the tape.

Searching for a scene using Cassette Memory – Title search

You can locate a scene where you have added a title (p. 52).



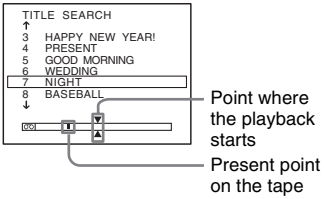
1 Slide the POWER switch repeatedly to select the PLAY/EDIT mode.

2 Press SEARCH M. on the Remote Commander repeatedly to select [TITLE SEARCH].

3 Press I◀◀ (previous)/▶▶I (next) on the Remote Commander to select a title that you want to play.

➡continued

Playback starts automatically from the selected title.



To cancel the operation

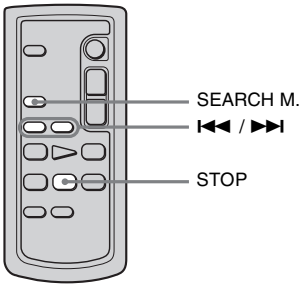
Press STOP on the Remote Commander.

Notes

- You cannot use Title search when [CM SEARCH] is set to [OFF] on the (CM SET) menu (it is set to [ON] by default) (p. 54).
- Title search will not function correctly when there is a blank section between recorded sections on the tape.

Searching for a scene by date of recording – Date search

When you are using a cassette with Cassette Memory, you can locate a scene by the recording date ([CM SEARCH] is set to [ON] by default). When you are using a cassette that does not have Cassette Memory, you can locate the point where the recording date changes.



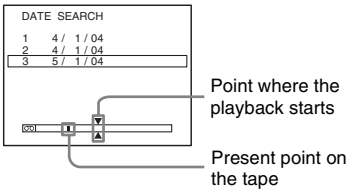
1 Slide the POWER switch repeatedly to select the PLAY/EDIT mode.

2 Press SEARCH M. on the Remote Commander repeatedly to select [DATE SEARCH].

3 Press I◄◄ (previous)/►►I (next) on the Remote Commander to select a recording date.

When your cassette has Cassette Memory, you can select the recording date itself. When your cassette does not have Cassette Memory, you can select the previous or the next date of the present point on the tape. Playback starts automatically from the point where the date changes.

Screen example (when the cassette has Cassette Memory):



To cancel the operation

Press STOP on the Remote Commander.

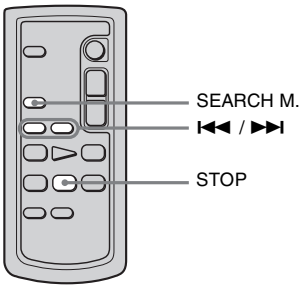
Notes

- If one day's recording is less than 2 minutes, your camcorder may not accurately find the point where the recording date changes.
- Date search will not function correctly when there is a blank section between recorded sections on the tape.
- You can record date/time data for up to 6 days. When you have recorded for more than 7 days on a tape, locate the date without using the Cassette Memory. To turn off the Cassette Memory, select (CM SET), [CM SEARCH], and then [OFF] (p. 54).

Searching for a still image – Photo search

When you are using a cassette with Cassette Memory, you can locate the still image by

choosing the recording date on the screen. ([CM SEARCH] is set to [ON] by default).
When you are using a cassette that does not have Cassette Memory, your camcorder searches the still image automatically regardless of the recording date.



1 Slide the POWER switch repeatedly to select the PLAY/EDIT mode.

2 Press SEARCH M. on the Remote Commander repeatedly to select [PHOTO SEARCH].

3 Press I◄◄ (previous)/►►I (next) on the Remote Commander to select the date or photo for playback.

When your cassette has Cassette Memory, you can select the recorded date.
When your cassette does not have Cassette Memory, your camcorder selects the still image before and behind the current point of the tape.
Playback of the photo starts automatically at the selected scene.

To cancel the operation

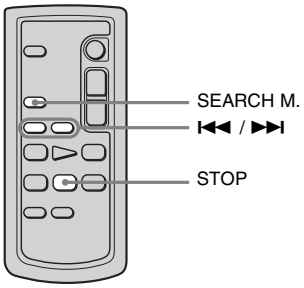
Press STOP on the Remote Commander.

Note

- Photo search will not function correctly when there is a blank section between recorded sections on the tape.

Playing back still images in sequence – Photo scan

You can also locate still images one after another and display each images for 5 seconds automatically.



1 Slide the POWER switch repeatedly to select the PLAY/EDIT mode.

2 Press SEARCH M. on the Remote Commander repeatedly to select [PHOTO SCAN].

3 Press I◄◄ (previous)/►►I (next) on the Remote Commander.

Each photo will be played back for about 5 seconds.

To cancel the operation

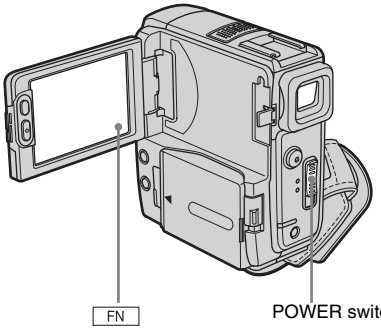
Press STOP on the Remote Commander.

Note

- Photo scan will not function correctly when there is a blank section between recorded sections on the tape.

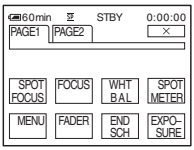
Changing the menu settings

You can change various settings or make detailed adjustments using the menu items displayed on the screen.

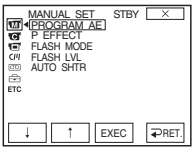


1 **Turn on the power (p. 16).**

2 **Touch [FN] to display [PAGE1].**

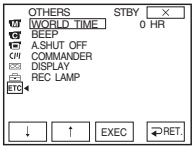


3 **Touch MENU to display the menu.**



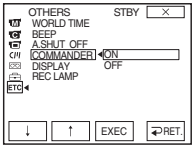
4 **Select the icon of the desired menu with [↓] / [↑], then touch [EXEC].**

- MANUAL SET (p. 45)
- CAMERA SET (p. 48)
- PLAYER SET (p. 50) (DCR-PC106E)
- VCR SET (p. 50) (DCR-PC107E)
- LCD/VF SET (p. 51)
- CM SET (p. 52)
- TAPE SET (p. 55)
- SETUP MENU (p. 58)
- OTHERS (p. 60)



5 **Select the desired item with [↓] / [↑], then touch [EXEC].**

The available menu items vary depending on the power mode of your camcorder. The unavailable items will not be displayed.



6 **Select the desired setting with [↓] / [↑], then touch [EXEC].**

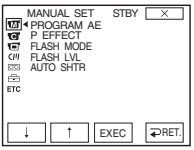
7 **Touch [×] (close) to hide the menu screen.**

You can go back to the previous screen each time you touch [↩ RET.].

Using the (MANUAL SET) menu

– PROGRAM AE/P EFFECT, etc.

You can select items listed below on the MANUAL SET menu. To select items, see "Changing the menu settings" (p. 44). The default settings are marked with ▷. The indicators in parentheses appear when the setting is selected. The settings you can adjust vary depending on the power mode of your camcorder. The screen shows the items you can operate at the moment. Unavailable items will be grayed out.



PROGRAM AE

You can record pictures easily in a situation that requires various techniques by selecting the following settings.

▷ AUTO	Select this when not using PROGRAM AE.	
SPOTLIGHT* (spotlight)	Select to prevent people's faces from appearing excessively white when subjects are lit by strong light, such as in a theater or at a wedding.	
PORTRAIT (soft portrait)	Select to bring out the subject such as people or flowers while creating a soft background.	
SPORTS* (sports lesson)	Select to minimize shake when shooting fast-moving subjects such as in tennis or golf.	
BEACH&SKI* (beach & ski)	Select to prevent people's faces from appearing dark in strong light or reflected light, such as at a beach in midsummer or on a ski slope.	
SUNSETMOON** (sunset & moon)	Select to maintain the atmosphere of situations such as sunsets, general night views, fireworks, and neon signs.	
LANDSCAPE** (landscape)	Select when shooting distant subjects such as mountains. This setting also prevents your camcorder from focusing on glass or metal mesh in windows that comes in between the camcorder and the subject.	

* Your camcorder is adjusted to focus only on subjects in the middle to far distance.

➡ *continued*

**Your camcorder is adjusted to focus only on distant subjects.

Note

- When you set the NIGHTSHOT PLUS switch to ON, [PROGRAM AE] does not work. (The indicator flashes.)

P EFFECT

You can add special effects (such as films) to a picture before or after recording. appears when the effect is selected.

▷OFF	Select when not using the Picture effect setting.	
NEG.ART	Select to record/play the picture with the color and brightness of the picture reversed.	
SEPIA	Select to record/play the picture appearing in sepia.	
B&W	Select to record/play the picture appearing in monochrome (black-and-white).	
SOLARIZE	Select to record/play the picture looking like an illustration with strong contrast.	
PASTEL	Select to record the picture looking like a pale pastel drawing. (This effect is not available during playback.)	
MOSAIC	Select to record the picture appearing mosaic-patterned. (This effect is not available during playback.)	

Note

- You cannot add effects to externally input pictures. Also, you cannot output pictures edited with Picture effect via the DV Interface.

Tip

- You can copy pictures edited using Picture effect to another tape (p. 63).

FLASH MODE

Note that these settings will not function with external flashes that do not support the following settings.

▷ON	To trigger the flash (optional) regardless of the brightness of the surroundings.
AUTO	To trigger the flash (optional) automatically.

FLASH LVL

Note that these settings will not function with external flashes that do not support the following settings.

HIGH	To make the flash (optional) level higher than normal.
▷NORMAL	To use the normal setting.
LOW	To make the flash (optional) level lower than normal.

Note

- The setting returns to [NORMAL] when you disconnect the power source from your camcorder for more than 5 minutes.

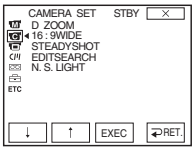
AUTO SHTR

▷ON	Select to automatically activate the electronic shutter to adjust the shutter speed when recording in bright conditions.
OFF	Select when recording without using the electronic shutter.

Using the (CAMERA SET) menu

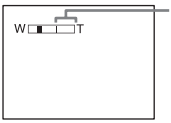
– D ZOOM/16:9WIDE, etc.

You can select items listed below on the CAMERA SET menu. To select items, see "Changing the menu settings" (p. 44).
The default settings are marked with ▷. The indicators in parentheses appear when the setting is selected. The settings you can adjust vary depending on the power mode of your camcorder. The screen shows the items you can operate at the moment. Unavailable items will be grayed out.



D ZOOM

You can select the maximum zoom level in case you want to zoom to a level greater than 10 times while recording on a tape. Note that the image quality decreases when you are using the digital zoom. This function is useful when recording enlarged pictures of a distant subject, such as a bird.



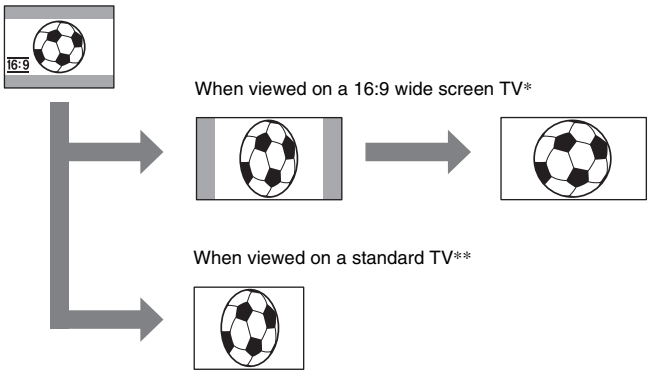
The right side of the bar shows the digital zooming zone.
The zooming zone appears when you select the zooming level.

▷OFF	Select to deactivate the digital zoom. Up to 10 times zoom is performed optically.
20 ×	Select to activate the digital zoom. 10 times through 20 times zoom is performed digitally.
120 ×	Select to activate the digital zoom. 10 times through 120 times zoom is performed digitally.

16:9WIDE

You can record a 16:9 wide picture on the tape to watch on a 16:9 wide-screen TV ([16:9WIDE] mode).
With this function [ON], your camcorder offers even wider angles when you move the power zoom lever to the "W" side than recording in [OFF].
Refer also to the instruction manuals supplied with your TV.

When viewed on the LCD screen/viewfinder



* The picture appears in full screen when the wide-screen TV switches to full mode.
**Played in 4:3 mode. When you play a picture in the wide mode, it appears as you have seen on the LCD screen or in the viewfinder.

▷OFF	Standard setting (to record pictures to play back on a 4:3 TV). The recorded picture will not be wide.
ON (16:9)	Select to record a picture to be played back on a 16:9 wide TV.

STEADYSHOT

You can select this function to compensate for camera-shake.

▷ON	Standard setting (enable the SteadyShot function).
OFF ( )	Select to deactivate the SteadyShot function. Select to shoot a stationary subject with a tripod, or when using a conversion lens (optional). Natural pictures are produced.

EDITSEARCH

▷OFF	Select not to display / – or + on the LCD screen.
ON	Select to display / – and + on the LCD screen, and use the EDITSEARCH function and Rec review (p. 34).

N.S.LIGHT

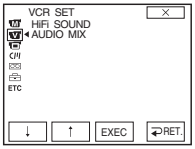
When using the NightShot plus function to record, you can record clearer pictures by using the NightShot Light to emit infrared rays (invisible).

▷ON	Select to use the NightShot Light (p. 30).
OFF	Select to disable the NightShot Light (p. 30).

Using the (PLAYER SET)/ (VCR SET) menu – HiFi SOUND/AUDIO MIX

You can select items listed below in the menu (the PLAYER SET menu for DCR-PC106E, the VCR SET menu for DCR-PC107E). To select these items, see “Changing the menu settings” (p. 44).

The default settings are marked with ▷. The indicators in parentheses appear when the setting is selected. The settings you can adjust vary depending on the power mode of your camcorder. The screen shows the items you can operate at the moment. Unavailable items will be grayed out.



HiFi SOUND

You can select how to play back audio recorded on a tape in stereo mode.

▷STEREO	Select to play back a stereo tape or dual sound track tape with main and sub sound.
1	Select to play back a stereo tape with the left channel sound or a dual sound track tape with main sound.
2	Select to play back a stereo tape with the right channel sound or a dual sound track tape with sub sound.

Notes

- You can play back a dual sound track cassette on this camcorder. However, you cannot record a dual sound track on this camcorder.
- The setting returns to [STEREO] when you disconnect the power source from your camcorder for more than 5 minutes.

AUDIO MIX

You can adjust the audio balance between the originally recorded sound ([ST1]) and sound added afterwards ([ST2]) on the tape (p. 71).

Notes

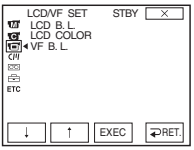
- You cannot adjust sound recorded in 16 bit audio mode.
- Only the originally recorded sound will be heard when you disconnect the power source from your camcorder for more than 5 minutes.

Using the (LCD/VF SET) menu

– LCD B.L./LCD COLOR/VF B.L.

You can select items listed below on the LCD/VF SET menu. To select items, see “Changing the menu settings” (p. 44).

The default settings are marked with ▷. The screen shows the items you can operate at the moment. Unavailable items will be grayed out.



LCD B.L.

You can adjust the brightness of the LCD screen’s backlight. The recorded picture will not be affected by this setting.

▷BRT NORMAL	Standard brightness.
BRIGHT	Select to brighten the LCD screen.

Notes

- When you connect your camcorder to outside power sources, [BRIGHT] is automatically selected for the setting.
- When you select [BRIGHT], the battery life is reduced by about 10 percent during recording.

LCD COLOR

Touch ↓ / ↑ to adjust the color on the LCD screen. The recorded picture will not be affected by this setting.

VF B.L.

You can adjust the brightness of the viewfinder. The recorded picture will not be affected by this setting.

▷BRT NORMAL	Standard brightness.
BRIGHT	Select to brighten the viewfinder screen.

Notes

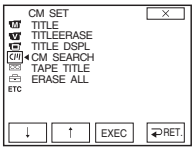
- When you connect your camcorder to outside power sources, [BRIGHT] is automatically selected for the setting.
- When you select [BRIGHT], the battery life is reduced by about 10 percent during recording.

Using the CM (CM SET) menu

– TITLE/TAPE TITLE/ERASE ALL, etc.

You can select items listed below on the CM SET menu. To select items, see “Changing the menu settings” (p. 44).

The default settings are marked with ▷. The settings you can adjust vary depending on the power mode of your camcorder. The screen shows the items you can operate at the moment. Unavailable items will be grayed out.



TITLE

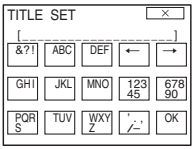
Any titles you have superimposed using this camcorder can only be viewed on a Mini DV video cassette device with the index titler function. If you superimpose a title, you will be able to search for it using Title search. You can superimpose up to about 20 titles (about 5 letters per title) on a cassette with Cassette Memory. Note, however, that only 11 titles can be recorded when other data (6 date/time data/1 cassette label/12 photo data) is recorded.

1 Select a desired title from the displayed titles (2 original titles that you have created before and the preset titles that have been stored in your camcorder). You can create original titles (up to 2 types of title of within 20 characters each) in the following procedure.

❶ Select [CUSTOM 1””] or [CUSTOM 2””] with ↓ / ↑, then touch [EXEC].

❷ Select [CREATE/EDIT] with ↓ / ↑, then touch [EXEC].

❸ Touch the button repeatedly to select the desired character on the button.



To erase a character: Touch ←.
To insert a space: Touch →.

❹ Touch → to move □ to select the next character, and enter the character in the same manner.

❺ When you have finished entering characters, touch OK.

2 Select the title you want to insert, then touch [EXEC].
To insert an original title, select OK and touch [EXEC].

3 Touch [COLOR], [SIZE], [POS↓] or [POS↑] as necessary to select a desired color, size, or position.

Color

white → yellow → violet → red → cyan → green → blue

Size

small ↔ large

(You can only select the small size when you are entering more than 13 characters.)

Position

You can select from 8 to 9 choices.

4 Touch [TITLE OK], then touch [SAVE TITLE].

During playback, playback pause, or recording

[TITLE SAVE] is displayed on the screen for about 5 seconds and the title is set.

During recording standby

[TITLE] appears. When you press REC START/STOP to start recording, [TITLE SAVE] is displayed on the screen for about 5 seconds, and the title is set.

Notes

- The point you superimposed the title may be detected as an index signal when searching a recording with other video device.
- When you are using your camcorder on the battery pack and do not operate it for 5 minutes, the power automatically goes off as the default setting. If you may take 5 minutes or longer to enter characters, set [A.SHUT OFF] on the ETC (OTHERS) menu to [NEVER] (p. 60). The power will not be turned off. Even though the power goes off, the characters you have entered remain stored in memory. Turn the power back on, then start again from step 1 to continue superimposing the title.

Tip

- To change a created title, select the title in step 1, touch [EXEC] and select [CREATE/EDIT], then touch [EXEC]. Then, reselect the characters again.

TITLEERASE

1 Select the title that you want to delete using ↓ / ↑, then touch [EXEC].

2 Confirm the title is the one you want to delete, then touch OK.

To cancel the operation, touch [CANCEL].

3 Touch ×.

TITLE DSPL

You can view the title when you play back the picture.

▷ON	Select to display the title when a scene superimposed with a title appears.
OFF	Select when you do not want to display the title.

➡ *continued*

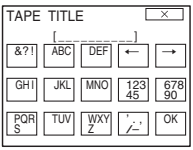
CM SEARCH

▷ON	Select to search for a scene, title, etc. using Cassette Memory (p. 41 - 43).
OFF	Select to search without using Cassette Memory.

TAPE TITLE

You can label a cassette with Cassette Memory (up to 10 letters).
The label will be displayed for approximately 5 seconds when you select the CAMERA mode and insert a cassette, or when you select the PLAY/EDIT mode. Up to 4 titles will be displayed at the same time if the cassette has titles superimposed.

1 Touch the button repeatedly to select the desired character on the button.



To erase a character: Touch [←].
To insert a space: Touch [→].

2 Touch [→] to move □ to select the next character, and enter the character in the same manner.

3 When you have finished entering characters, touch [OK].

4 Touch [×].

Tips

- To erase the label you have created, touch [←] repeatedly to erase the characters, then touch [OK].
- To change the label you have created, insert the cassette into your camcorder and go through the procedure from step 1.

ERASE ALL

You can delete all data such as date, title, cassette label, and photo data saved in the Cassette Memory at one time.

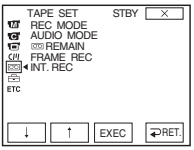
1 Select [OK], then touch [EXEC].
To cancel deletion of all data, select [RETURN].

2 Select [EXECUTE], then touch [EXEC].

3 Touch [×].

Using the (TAPE SET) menu – REC MODE/FRAME REC/INT.REC, etc.

You can select items listed below on the TAPE SET menu. To select these items, see "Changing the menu settings" (p. 44).
The default settings are marked with ▷. The indicators in parentheses appear when the setting is selected. The settings you can adjust vary depending on the power mode of your camcorder. The screen shows the items you can operate at the moment. Unavailable items will be grayed out.



REC MODE

▷SP (SP)	Select to record in the SP (Standard Play) mode on a cassette.
LP (LP)	Select to increase the recording time to 1.5 times the SP mode (Long Play). The use of Sony Excellence/Master mini DV cassette is recommended to get the most out of your camcorder.

Notes

- You cannot add sound on the tape recorded in the LP mode.
- If you record in the LP mode, a mosaic-like noise may appear or sound may be interrupted when you play back the tape on other camcorders or VCRs.
- When you mix recordings in the SP mode and in the LP mode on one tape, the playback picture may be distorted or the time code may not be written properly between the scenes.

AUDIO MODE

▷12BIT	Select to record in the 12-bit mode (2 stereo sounds).
16BIT (16b)	Select to record in the 16-bit mode (1 stereo sound with high quality).

REMAIN

▷AUTO	Select to display the remaining tape indicator for about 8 seconds: • After you select the CAMERA mode with the cassette inserted, and your camcorder calculates the remaining amount of tape. • When you touch ▶II (play/pause).
ON	Select to always display the remaining tape indicator.

FRAME REC

You can record pictures with a stop-motion animated effect by alternately frame recording and then moving the subject a little. Operate your camcorder using the Remote Commander to prevent camera shake.

▷OFF	Select to record in the standard recording mode.

➡ *continued*

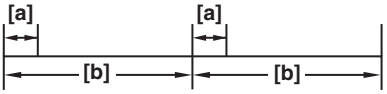
ON ( )	Select to record pictures using frame recording. **1 Select [ON], then touch [EXEC].** **2 Touch [×].** **3 Press REC START/STOP.** A picture (approximately 5 frames) is recorded, and your camcorder enters the standby mode. **4 Move the subject and repeat step 3.**

Notes

- When you use frame recording continuously, the remaining tape time will not be indicated correctly.
- The last scene will be longer than other scenes.

INT.REC

You can record pictures on the tape at a selected interval.
You can achieve excellent recordings of flowers blooming, etc. with this function.
Connect your camcorder to the wall socket using the supplied AC Adaptor during the operation.



a. [REC TIME]
b. [INTERVAL]

1 Select [SET], then touch [EXEC].

2 Select [INTERVAL], then touch [EXEC].

3 Select a desired interval time (30 seconds, 1, 5, 10 minutes), then touch [EXEC].

4 Select [REC TIME], then touch [EXEC].

5 Select a desired recording time (0.5, 1, 1.5, 2 seconds), then touch [EXEC].

6 Touch [RET.].

7 Select [ON], then touch [EXEC].

8 Touch [×].
flashes.

9 Press REC START/STOP.
Interval recording starts.
lights up on the screen during Interval recording.
To cancel Interval recording, set to [OFF], then touch [EXEC] in the menu settings.

Note

- There may be a discrepancy in recording time of up to ± 5 frames from the selected time.

Tips

- If you adjust the focus manually, you may be able to record clear pictures even if the light changes (p. 31).
- You can silence the beeps during recording (p. 60).

Using the (SETUP MENU) menu – CLOCK SET/ USB STREAM/LANGUAGE, etc.

You can select items listed below on the SETUP MENU menu. To select items, see “Changing the menu settings” (p. 44).

The default settings are marked with ▷. The settings you can adjust vary depending on the power mode of your camcorder. The screen shows the items you can operate at the moment. Unavailable items will be grayed out.

CLOCK SET

You can set the date and time (p. 18).

USB STREAM

You can connect a USB cable (supplied) to your camcorder, and view the picture displayed on the screen of your camcorder on your computer (USB Streaming). For details, refer to the “Computer Applications Guide.”

▷OFF	Select to deactivate the USB Streaming function.
ON	Select to activate the USB Streaming function.

LANGUAGE

You can select or change the language used for the on-screen display (p. 21). You can select from German, Greek, English, Simplified English, Spanish, French, Italian, Dutch, Portuguese, Russian, Traditional-Chinese, Simplified-Chinese, Arabic or Persian.

DEMO MODE

When you remove a cassette from your camcorder, and select the CAMERA mode, you can view the demonstration in about 10 minutes.

▷ON	Select to see an overview of the functions available such as when you are using this camcorder for the first time.
OFF	Select when you do not want to use DEMO MODE.

Note

- You can view the demonstration only when the NIGHTSHOT PLUS switch is set to OFF.

Tips

- The demonstration will be suspended in situations such as those described below.
  - – When you touch the screen during the demonstration. (The demonstration starts again in about 10 minutes.)
  - – When a cassette is inserted.

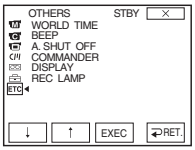
– When a mode other than CAMERA is selected.

- If [A.SHUT OFF] is set to [5min] when the camcorder is used on the battery pack, the power will be turned off after approximately 5 minutes (p. 60).

Using the ETC (OTHERS) menu – WORLD TIME, etc.

You can select items listed below on the OTHERS menu. To select these items, see “Changing the menu settings” (p. 44).

The default settings are marked with ▷. The settings you can adjust vary depending on the power mode of your camcorder. The screen shows the items you can operate at the moment. Unavailable items will be grayed out.



WORLD TIME

You can adjust the time difference when using your camcorder abroad. Set the time difference by touching ↓ / ↑, and the clock will be adjusted in accordance with the time difference. If you set the time difference to 0, the clock returns to the originally set time.

BEEP

▷MELODY	Select to sound a melody when you start/stop recording, operate the touch panel, or when an unusual condition occurs on your camcorder.
NORMAL	Select to sound a beep instead of the melody.
OFF	Select to cancel the melody, the beep sound, the shutter sound or the confirmation beep sound for operation on the touch panel.

A.SHUT OFF

▷5min	Select to activate Auto shut off. When approximately 5 minutes have elapsed while you do not operate your camcorder, the camcorder is automatically turned off to prevent the battery from becoming consumed.
NEVER	Select to deactivate Auto shut off.

Note

- When you connect your camcorder to the wall socket, [A.SHUT OFF] is automatically set to [NEVER].

COMMANDER

▷ON	Select to use the Remote Commander supplied with your camcorder.
OFF	Select to deactivate the Remote Commander to prevent your camcorder from responding to a command sent by another VCR remote control unit.

Note

- The setting returns to [ON] when you have the power source disconnected from your camcorder for more than 5 minutes.

DISPLAY

▷LCD	Select to show the displays such as the time code on the LCD screen and in the viewfinder.
V-OUT/LCD	Select to show the displays such as the time code on the TV screen, LCD screen, and in the viewfinder.

REC LAMP

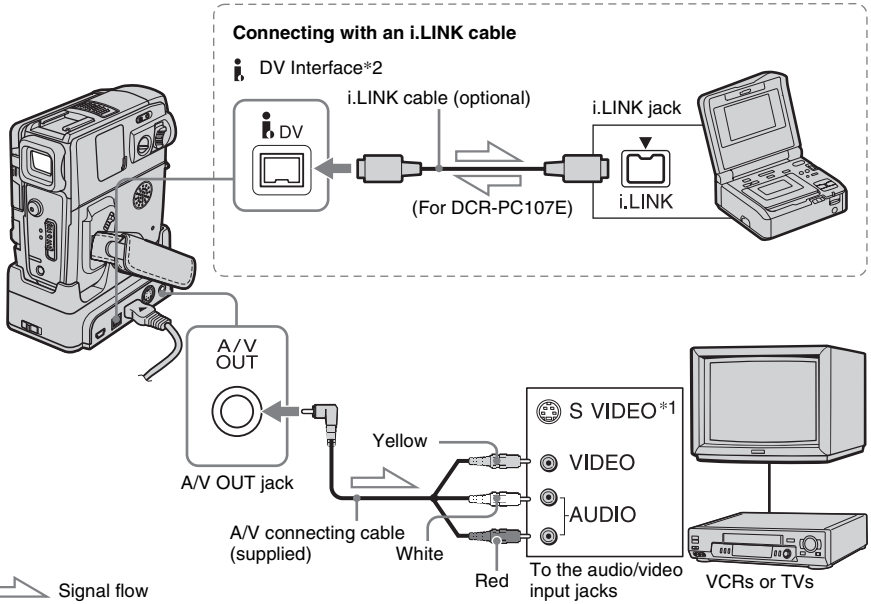
▷ON	Select to turn on the camera recording lamp on the front of your camcorder during recording.
OFF	Select this setting in the following recording situations. The camera recording lamp will not light up during recording. • When you do not want the subject to be nervous about being recorded. • When you are recording close to the subject. • When the subject reflects the recording lamp.

VIDEO EDIT

Select to make programs and dubbing the selected scenes to a tape on a VCR (p. 64).

Connecting to a VCR or TV

You can create a copy of the picture recorded on your camcorder on other recording device (p. 63).
For DCR-PC107E, you can also record the picture from a VCR to a tape inserted into your camcorder (p. 64).
Connect your camcorder via the Handycam Station or the A/V OUT jack of your camcorder to a TV using the supplied A/V connecting cable.
Connect your camcorder to a TV or VCR as shown in the following illustration.



*1 By using an S video cable (optional), higher quality DV format pictures can be produced. When there is an S video jack on the device to be connected, connecting the S video cable (optional) to the S video jacks on both the Handycam Station and the device instead of using the yellow plug is recommended. The audio will not be output when you connect with the S video plug alone.

*2 For DCR-PC106E:
The DV Interface of your Handycam Station is designed for output use only. Your Handycam Station does not accept input data from the connected device.
For DCR-PC107E:
The DV Interface of your Handycam Station is designed for input/output use.

Notes on the A/V connecting cable

- When you connect your camcorder to the other devices using the A/V connecting cable, make sure the [DISPLAY] setting in the ETC (OTHERS) menu is set to [LCD] (the default setting) before connecting (p. 61).
- When you are connecting your camcorder to a monaural device, connect the yellow plug of the A/V connecting cable to the video jack, and the red or the white plug to the audio jack on the VCR or the TV.
- Do not connect the A/V connecting cables to both your camcorder and the Handycam Station. The recorded picture may be distorted.

To use an i.LINK cable for connection

Use an i.LINK cable (optional) to connect your camcorder to the other device via the i, DV Interface. The video and sound signals are transmitted digitally, producing high quality pictures. Note that you cannot record the picture and sound separately. For details, see page 86.

Dubbing to another tape

You can copy and edit the picture played back on your camcorder to other recording devices (such as VCRs).

1 Connect your VCR to your camcorder as a recording device (p. 62).

2 Prepare your VCR for recording.

- Insert a cassette for recording.
- If your VCR has an input selector, set it to the input mode.

3 Prepare your camcorder for playback.

- Insert the recorded cassette.
- Slide the POWER switch repeatedly to select the PLAY/EDIT mode.

4 Start the playback on your camcorder, and record it on the VCR.

Refer to the operating instructions supplied with your VCR for details.

5 When the dubbing is finished, stop your camcorder and the VCR.

Notes

- When your camcorder is connected to the VCR via the i, DV Interface, you cannot record the title, indicators, information for the Cassette Memory.
- When dubbing using the A/V connecting cable, press DISPLAY/BATT INFO to hide indicators such as time code (p. 38). Otherwise, they will be recorded on the tape.
- When dubbing using the A/V connecting cable, to record the date/time and camera settings data, have it displayed on the screen (p. 38).
- Pictures edited with Picture effect ([P EFFECT] (p. 46)) cannot be output via the i, DV Interface.
- When connected using the i.LINK cable, the recorded picture becomes rough when a picture is paused on your camcorder while recording to a VCR.

Recording pictures from a VCR

(DCR-PC107E)

You can record and edit pictures from a VCR on a tape inserted in your camcorder via an i.LINK cable.
Insert a cassette for recording in your camcorder.

1 Connect your VCR to your camcorder (p. 62).

2 Slide the POWER switch repeatedly to select the PLAY/EDIT mode.

3 Set your camcorder to recording pause mode.

1 Touch FN and select [PAGE3].
2 Touch [REC CTRL].
3 Touch [REC PAUSE].

4 Start playing the cassette on your VCR.

The picture played on the connected device appears on the LCD screen of your camcorder.

5 Touch [REC START] at the point you want to start recording.

6 Touch ■ (stop) to stop recording.

7 Touch [RET.], then × .

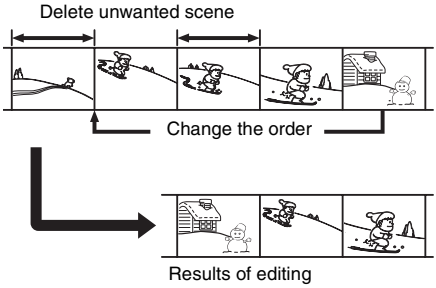
Tip

- DV IN appears when you connect your camcorder and other devices.

Dubbing selected scenes from a tape

– Digital program editing

You can select up to 20 scenes (programs) and record them in the desired order to other recording device such as VCRs.



Step 1: Preparing your camcorder and VCR for operation

Follow the steps below when you are performing Digital program editing for the first time to a tape in a VCR. You can skip this setting if you have set up the VCR by the following procedure before.

Notes

- You cannot perform Digital program editing on a VCR that does not support [IR SETUP] codes.
- The operating signal for Digital program editing cannot be transferred via the LANC jack.
- When your camcorder is connected to the VCR via the i.LINK, DV Interface, you cannot record the title, indicators, information for the Cassette Memory.

1 Connect your VCR to the camcorder as a recording device (p. 62).

You can use either the A/V connecting cable or the i.LINK cable to make the connection. The dubbing procedure is easier with the i.LINK connection.

2 Prepare your VCR.

- Insert a cassette for recording.
- Set the input selector to input mode if your VCR has one.

3 Prepare your camcorder (playing device).

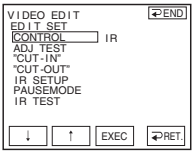
- Insert a cassette for editing.
- Slide the POWER switch repeatedly to select the PLAY/EDIT mode.

4 Touch FN to display [PAGE1].

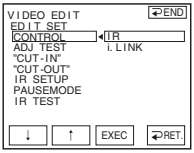
5 Touch MENU.

6 Select ETC (OTHERS), then select [VIDEO EDIT] with ↓ / ↑, then touch [EXEC].

7 Touch [EDIT SET].



8 Select [CONTROL] with ↓ / ↑, then touch [EXEC].



9 Select i.LINK or [IR].

When connecting with an i.LINK cable

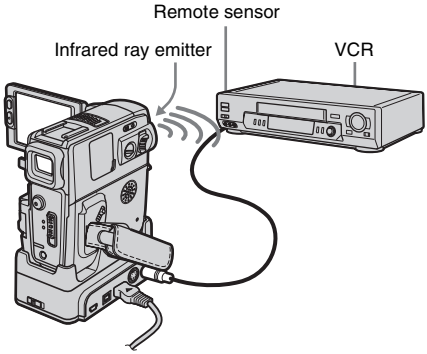
Select i.LINK with ↓ / ↑, then [EXEC]. Go on to "Step 2: Adjusting the synchronization of the VCR" (p. 66).

When connecting with an A/V connecting cable

Select [IR] with ↓ / ↑, then [EXEC]. Follow the procedure described in "To set the [IR SETUP] code" (p. 65).

To set the [IR SETUP] code

When you connect with an A/V connecting cable, you need to check the [IR SETUP] code signal to see if your VCR can be operated by your camcorder (infrared ray emitter).



1 Select [IR SETUP] with ↓ / ↑, then touch [EXEC].

2 Select the [IR SETUP] code of your VCR with ↓ / ↑, then touch [EXEC].
For the [IR SETUP] code of your VCR, refer to "[IR SETUP] code list" (p. 66). When there is more than 1 code listed for the manufacturer of your VCR, try each code and find the most appropriate one.

3 Select [PAUSEMODE] with ↓ / ↑, then touch [EXEC].

4 Touch ↓ / ↑ to select the mode to cancel the recording pause on your VCR, then touch [EXEC].
Refer to the operating instructions supplied with your VCR for details on operation.

5 Point the infrared ray emitter of your camcorder towards the remote sensor on your VCR, from about 30 cm (12 in.) away, with no obstructions.

6 Insert a cassette into your VCR, and set the VCR to recording pause.

7 Select [IR TEST] with ↓ / ↑, then touch [EXEC].

➡ *continued*

8 **Select [EXECUTE] with ↓ / ↑, then touch [EXEC].**
The recording starts on your VCR when the setting is correct. [COMPLETE] appears when the [IR SETUP] code test is finished. Go on to "Step 2: Adjusting the synchronization of the VCR" (p. 66).
When recording fails to start, select another [IR SETUP] code and try again.

[IR SETUP] code list

The following [IR SETUP] codes are recorded on your camcorder by default. (It is set at "3" as the default setting.)

Manufacturing company	[IR SETUP] code
Sony	1, 2, 3, 4, 5, 6
Aiwa	47, 53, 54
Akai	50, 62, 74
Alba	73
Amstrad	73
Baird	30, 36
Blaupunkt	11, 83
Bush	74
CGM	36, 47, 83
Clatronic	73
Daewoo	26
Ferguson	76, 83
Fisher	73
Funai	80
Goldstar	47
Goodmans	26, 84
Grundig	9, 83
Hitachi	42, 56
ITT/Nokia Instant	36
JVC	11, 12, 15, 21
Kendo	47
Loewe	16, 47, 84
Luxor	89
Mark	26*
Matsui	47, 58*, 60
Mitsubishi	28, 29
Nokia	36, 89
Nokia Oceanic	89
Nordmende	76
Okano	60, 62, 63
Orion	58*, 70
Panasonic	16, 78
Philips	83, 84, 86
Phonola	83, 84
Roadstar	47
SABA	21, 76, 91
Salora	89
Samsung	22, 32, 52, 93, 94
Sanyo	36
Schneider	10, 83, 84
SEG	73
Seleco	47, 74
Sharp	89
Siemens	10, 36
Tandberg	26
Telefunken	91, 92
Thomson	76, 100
Thorn	36, 47
Toshiba	40, 93
Universum	47, 70, 84, 92
W.W. House	47
Watoson	58, 83

* TV/VCR component

Step 2: Adjusting the synchronization of the VCR

Follow the steps below when you are performing Digital program editing for the first time to a tape in a VCR. You can skip this setting if you have set up your VCR before using the following procedure.

You can adjust the synchronization of your camcorder and the VCR to avoid not recording the starting scene.

1 Remove the cassette from your camcorder. Prepare a pen and paper to take notes.

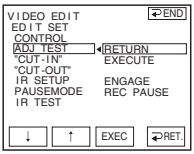
2 Set the VCR to recording pause mode.

Skip this step if you have selected i.LINK in step 9 (p. 65).

Note

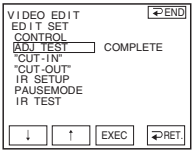
- Run the tape for about 10 seconds before pausing. The starting scenes may not get recorded when you start recording from the beginning of the tape.

3 Select [ADJ TEST] with ↓ / ↑, then touch [EXEC].



4 Select [EXECUTE] with ↓ / ↑, then touch [EXEC].

[EXECUTING] flashes and a picture (about 50 seconds long) with 5 [IN] and [OUT] indicators each for adjusting synchronization is recorded. [COMPLETE] appears when the recording is finished.

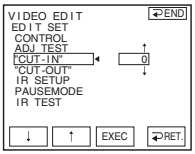


5 Rewind the tape on your VCR, then play back in slow mode.

5 opening numbers for each [IN] and closing numbers for each [OUT] appear.

6 Take a note of the opening number value of each [IN] and the closing number value of each [OUT], then calculate the average number value for each [IN] and [OUT].

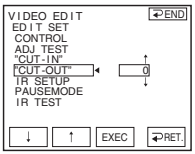
7 Select ["CUT-IN"] with ↓ / ↑, then touch [EXEC].



8 Touch ↓ / ↑ to select the average number value for [IN], then touch [EXEC].

The calculated start position for recording is set.

9 Select ["CUT-OUT"] with ↓ / ↑, then touch [EXEC].



10 Touch ↓ / ↑ to select the average number value for [OUT], then touch [EXEC].

The calculated stop position for recording is set.

11 Touch [↩ END], then touch ×.

Recording the selected scenes as programs

➡ *continued*

When you are performing Digital program editing for the first time to a tape in a VCR, go through the procedures described in Steps 1 and 2 (p. 64 - p. 66) beforehand.

1 Prepare a cassette.

Insert a tape to be played back into the camcorder, then insert a cassette for recording into your VCR.

2 Touch FN to display [PAGE1].

3 Touch MENU.

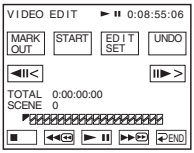
4 Select ETC (OTHERS), then select [VIDEO EDIT] with ↓ / ↑, then touch [EXEC].

5 Search for the beginning of the first scene that you want to dub on your camcorder, then pause playback.

You can adjust the position with ◄II< / II►> (frame).

6 Touch [MARK IN].

The starting point of the first program is set, and the upper part of the program mark changes to light blue.

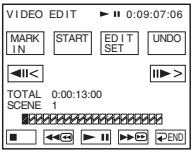


7 Search for the end of the first scene that you want to record on your camcorder, then pause playback.

You can adjust the position with ◄II< / II►> (frame).

8 Touch [MARK OUT].

The ending point of the first program is set, and the lower part of the program mark changes to light blue.

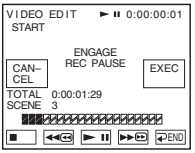


9 Repeat steps 5 to 8 and create programs.

10 Set your VCR to recording pause.

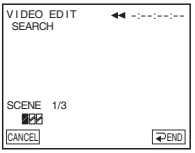
Skip this step if your camcorder is connected via an i.LINK cable.

11 Touch [START].



12 Touch [EXEC].

A search for the beginning of the first program starts, then the recording starts. [SEARCH] appears during the search and [EDITING] appears during editing.



When a program is recorded, the program mark stops flashing and remains lit. When all programs have been recorded, the program editing operation stops automatically.

To cancel recording, touch [CANCEL].

To end Digital program editing

Touch [⮌ END].

To save a program without using it to record

Touch [⮐ END] in step 9.
The program is stored in memory until the cassette is ejected.

To erase programs

1 **Follow steps 1 to 4 in "Recording the selected scenes as programs" (p. 67), then touch [UNDO].**

2 **Touch [ERASE 1MARK] to delete the last set program. Or, touch [ERASE ALL] to delete all the programs.**

3 **Touch [EXEC].**
The programs are deleted.
To cancel this operation, touch [CANCEL].

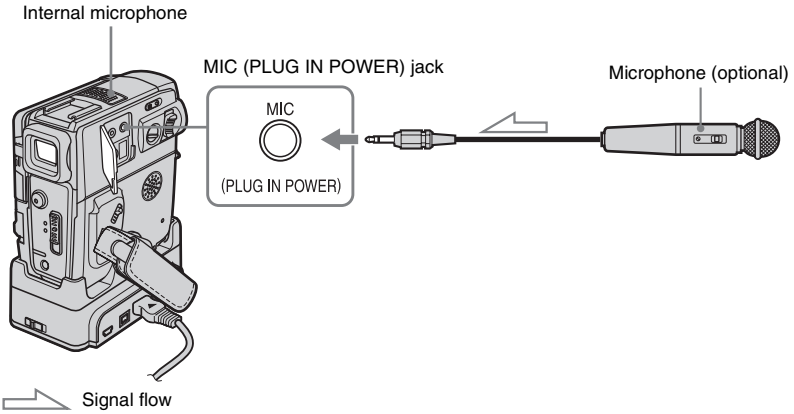
Notes

- You cannot set the starting point or ending point on a blank section of the tape. If there is a blank section, the total time may not appear correctly.
- When you cannot operate the device correctly using an i.LINK cable connection, select [IR] in step 9 on page 65, and set the [IR SETUP] code.

Dubbing sound to a recorded tape

You can record additional audio to the original sound on the tape. You can add sound to a tape already recorded in the 12-bit mode without erasing the original sound.

Preparing for audio recording



Record audio in one of the following ways.

- Using the internal microphone (no connection required).
- Connecting a microphone (optional) to the MIC jack.

The audio input to be recorded takes precedence over others in the order of MIC jack ⟶ internal microphone.

Notes

- You cannot record additional audio:
  - When the tape is recorded in the 16-bit mode.
  - When the tape is recorded in the LP mode.
  - When your camcorder is connected via the i.LINK cable.
  - On blank sections of the tape.
  - When the write-protect tab of the cassette is set to SAVE.
- When you are using the internal microphone to record additional sound, the picture will not be output from the A/V OUT jack. Check the picture on the LCD screen or the viewfinder.
- When you use an external microphone (optional) to record additional audio, you can check the picture and the sound by connecting your camcorder to a TV using the A/V connecting cable. However, the sound you have recorded afterwards is not output from the speaker. Check the sound by using a TV.

Recording sound

1 Insert a recorded tape into your camcorder.

2 Slide the POWER switch repeatedly to select the PLAY/EDIT mode.

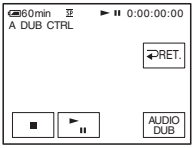
3 Touch ▶II (play) to play back the tape.

4 Touch ▶II (pause) again at the point where you want to start recording the sound.

The playback pauses.

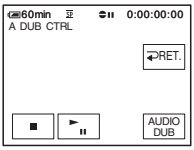
5 Touch FN and select [PAGE3].

6 Touch [A DUB CTRL].



7 Touch [AUDIO DUB].

A green ⏷II mark appears on the LCD screen.



8 Touch ▶II (play) and start playing back the audio you want to record at the same time.

A red ⏷ mark remains on the LCD screen while recording sound.
The new sound is recorded in stereo 2 ([ST2]) during the playback of the tape.

9 Touch ■ (stop) when you want to stop recording.

To dub on other scenes, repeat steps 3 and 4 to select scenes, then touch [AUDIO DUB].

10 Touch [↩ RET.], then ×.

To set the end point for audio dubbing

During playback, press ZERO SET MEMORY on the Remote Commander at the scene at which you want to stop audio dubbing. Then, perform steps 4 to 8. The recording stops automatically at the selected scene.

Note

- You can only record additional audio over a tape recorded on your camcorder. The sound may deteriorate when you dub audio on a tape recorded on other camcorders (including other DCR-PC106E/PC107E camcorders).

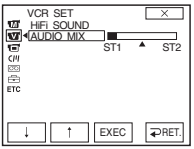
Checking and adjusting the recorded sound

1 Play back the tape on which you have recorded audio in "Recording sound" (p. 70).

2 Touch FN to display [PAGE1].

3 Touch MENU.

4 Select P (PLAYER SET) for DCR-PC106E, or V (VCR SET) for DCR-PC107E, then select [AUDIO MIX] with ↓ / ↑, then touch [EXEC].



5 Touch ↓ / ↑ to adjust the balance between the original sound ([ST1]) and the sound added afterwards ([ST2]). Then, touch [EXEC].

The original sound ([ST1]) is output in the default setting.
The adjusted audio balance returns to the default setting in about 5 minutes after the battery pack or other power sources have been disconnected.

Creating DVDs or VCDs

When your camcorder is connected to a Sony VAIO series personal computer, you can easily burn the picture recorded on the tape to a DVD (Direct Access to “Click to DVD”). And, when your camcorder is connected to a personal computer, you can easily burn the picture recorded on the tape to a CD-R (Direct Access to Video CD Burn).

1 Touch FN and select [PAGE2].

2 Touch [BURN DVD] when creating a DVD, or touch [BURN VCD] when creating a VCD.

For details, refer to the “Computer Applications Guide.”

Troubleshooting

If you run into any problem using your camcorder, use the following table to troubleshoot the problem. If the problem persists, remove the power source and contact your Sony dealer.

If "C:□□:□□" is displayed on the LCD screen or the viewfinder, the self-diagnosis display function is activated. See page 79 for details.

Overall operations

Symptom	Cause and/or Corrective Actions
The power does not turn on.	• The battery pack is discharged, running low, or not attached to the camcorder. →Attach a charged battery pack to the camcorder. (p. 12) →Use the AC Adaptor to connect to the wall socket. (p. 15) • Your camcorder is not inserted into the Handycam Station correctly. →Insert your camcorder into the Handycam Station correctly. (p. 3)
The camcorder does not operate even when the power is set to on.	→Disconnect the AC Adaptor from a wall socket or remove the battery pack, then reconnect it after about 1 minute. If the functions still do not work, press the RESET button using a sharp-pointed object. (If you press the RESET button, all settings including the clock setting are reset.)
The supplied Remote Commander does not function.	→Set [COMMANDER] on the ETC (OTHERS) menu to [ON]. (p. 60) →Insert a battery into the battery holder with the + – polarities correctly matching the + – marks. If this still does not solve the problem, insert a new battery since the battery is dead. (p. 99) →Remove any obstructions between the Remote Commander and the remote sensor.
The camcorder gets warm.	• This is because the power has been turned on for a long time. This is not a malfunction.

Battery/Power sources

Symptom	Cause and/or Corrective Actions
The CHARGE lamp does not light while the battery pack is being charged.	→Attach the battery pack to the camcorder correctly. If the lamp still does not light up, then it indicates that no power is supplied from the wall socket. →Insert your camcorder into the Handycam Station correctly. (p. 3) • The battery charge is completed. (p. 12)
The CHARGE lamp flashes while the battery pack is being charged.	→Attach the battery pack to the camcorder correctly. If the problem persists, disconnect the AC Adaptor from the wall socket and contact your Sony dealer. The battery pack may be damaged. (p. 12)

→*continued*

Symptom	Cause and/or Corrective Actions
The battery pack is quickly discharged.	• The temperature of the environment is too low, or the battery pack has not been charged enough. This is not a malfunction. ➔Fully charge the battery again. If the problem persists, replace the battery pack with a new one. It may be damaged. (p. 12, 85)
The remaining battery time indicator does not indicate the correct time.	• The temperature of the environment is too high or too low, or the battery pack has not been charged enough. This is not a malfunction. ➔Fully charge the battery again. If the problem persists, replace the battery pack with a new one. It may be damaged. (p. 12, 85)
The power turns off frequently although the remaining battery indicator indicates that the battery pack has enough power to operate.	• A problem has occurred in the remaining battery time indicator, or the battery pack has not been charged enough. ➔Fully charge the battery again to correct the indication. (p. 12)
The power abruptly turns off.	• [A.SHUT OFF] in the ETC (OTHERS) menu is set to [5min]. (p. 60) ➔When approximately 5 minutes have elapsed while you do not operate your camcorder, the camcorder is automatically turned off. Slide the POWER switch down to turn the power on again. (p. 16) Or use the AC Adaptor.
A problem occurs when the camcorder is connected to the AC Adaptor.	➔Turn off the power, and disconnect the AC Adaptor from the wall socket. Then, connect it again.

Cassette tapes

Symptom	Cause and/or Corrective Actions
Cassette cannot be ejected from the compartment.	➔Make sure the power source (battery pack or AC Adaptor) is connected correctly. (p. 12) ➔Remove the battery pack from the camcorder, then attach it again. (p. 12) ➔Attach a charged battery pack to the camcorder. (p. 12)
Cassette is not ejected even when the cassette lid is open.	• Moisture condensation is starting in your camcorder. (p. 88)
The Cassette Memory indicator does not appear while using a cassette with Cassette Memory.	➔Clean the gold-plated connector of the cassette. (p. 84)
The remaining tape indicator is not displayed.	➔Set [REMAIN] to [ON] on the (TAPE SET) menu to always display the remaining tape indicator. (p. 55)
A cassette label is not recorded.	➔Use a cassette with Cassette Memory. (p. 83) ➔Erase unnecessary titles when the Cassette Memory is full. (p. 53) ➔Set the write-protect tab to REC. (p. 84)

LCD screen/viewfinder

Symptom	Cause and/or Corrective Actions
An unknown language appears on the screen.	➔See page 21.
An unknown picture appears on the screen.	• The camcorder is in [DEMO MODE]. ([DEMO MODE] is automatically displayed when you leave the camcorder for 10 minutes after selecting CAMERA without inserting a cassette.) ➔Touch on the LCD screen or insert a cassette to cancel [DEMO MODE]. You can also set [DEMO MODE] to [OFF] on the (SETUP MENU) menu. (p. 58)
An unknown indicator appears on the screen.	➔Refer to the indicator list. (p. 101)
The buttons do not appear on the touch panel.	➔Touch the LCD panel lightly. ➔Press DISPLAY/BATT INFO (or DISPLAY on the Remote Commander). (p. 38)
The buttons on the touch panel do not work correctly or do not work at all.	➔Adjust the screen ([CALIBRATION]). (p. 89)
The picture in the viewfinder is not clear.	➔Extend the viewfinder. (p. 17) ➔Use the viewfinder lens adjustment lever to adjust the lens. (p. 17)
The picture in the viewfinder has disappeared.	➔Close the LCD panel. The picture is not displayed in the viewfinder when the LCD panel is open. (p. 17)
The picture remains on the LCD screen.	• This occurs when your camcorder is turned off forcibly by removing the battery pack, disconnecting the DC plug from your camcorder or the Handycam Station, or the like while turning on the power. This is not a malfunction.

Recording

Symptom	Cause and/or Corrective Actions
The tape does not start when you press REC START/STOP.	➔Slide the POWER switch to select the CAMERA mode. (p. 16) ➔The tape has reached the end. Rewind it, or insert a new cassette. ➔Set the write-protect tab to REC or insert a new cassette. (p. 84) ➔The tape is stuck to the drum due to moisture condensation. Remove the cassette and leave your camcorder for at least 1 hour, then re-insert the cassette. (p. 88)
The power abruptly turns off.	• [A.SHUT OFF] in the ETC (OTHERS) menu is set to [5min]. (p. 60) ➔When approximately 5 minutes have elapsed while you do not operate your camcorder, the camcorder is automatically turned off. Slide the POWER switch down to turn the power on again. (p. 16) Or use the AC Adaptor. ➔Charge the battery pack. (p. 12)

➔*continued*

Symptom	Cause and/or Corrective Actions
The SteadyShot function does not function.	→Set STEADYSHOT to [ON] in the (CAMERA SET) menu. (p. 49)
Auto focus does not function.	→Set [FOCUS] to [AUTO]. (p. 31) →The recording conditions are not suitable for auto focus. Adjust the focus manually. (p. 31)
A vertical band appears when recording candlelight or electric light in the dark.	• This occurs when the contrast between the subject and the background is too high. This is not a malfunction.
A vertical band appears when recording a bright subject.	• This phenomenon is called the smear effect. This is not a malfunction.
The color of the picture is not correctly displayed.	→Deactivate the NightShot plus function. (p. 30)
Picture appears too bright on the screen, and the subject does not appear on the screen.	→Deactivate the NightShot plus function in bright places. (p. 30) →Cancel the back light function. (p. 27)
The screen is too dark for the image to be seen.	• The LCD screen backlight is switched off. →Set LCD BACKLIGHT to turn on the backlight for the LCD panel. (p. 17)
The shutter sound is not heard.	→Set [BEEP] to [MELODY] or [NORMAL] on the (OTHERS) menu. (p. 60)
Black bands appear when you record a TV screen or computer screen.	→Set STEADYSHOT to [OFF] on the (CAMERA SET) menu. (p. 49)
The external flash (optional) does not work.	• The power of the flash is not turned on, or the flash is not attached correctly. • 2 or more flashes are attached. Only 1 external flash can be attached.
Flickering or changes in color occurs.	• This occurs when recording pictures under a fluorescent lamp, sodium lamp, or mercury lamp in the [PORTRAIT] or [SPORTS] mode. →Set the [PROGRAM AE] to [AUTO] in the (MANUAL SET) menu. (p. 45)
The END SEARCH function does not work.	• The cassette was ejected after recording when using a cassette without Cassette Memory. (p. 83) • The cassette is new and has nothing recorded.
The END SEARCH function does not work correctly.	• There is a blank section in the beginning or middle of the tape. This is not a malfunction.

Playback

Symptom	Cause and/or Corrective Actions
Cannot play back.	→If the tape has reached the end, rewind the tape. (p. 35)
Horizontal lines appear on the picture. The displayed pictures are not clear or do not appear.	→Clean the head using the cleaning cassette (optional). (p. 88)

Symptom	Cause and/or Corrective Actions
No sound or only a low sound is heard.	→Set [HiFi SOUND] to [STEREO] in the P (PLAYER SET) menu for DCR-PC106E, or in the V (VCR SET) menu for DCR-PC107E. (p. 50) →Turn up the volume. (p. 35) →On the P (PLAYER SET) menu for DCR-PC106E, or on the V (VCR SET) menu for DCR-PC107E, adjust [AUDIO MIX] from the [ST2] (additional sound) side until the sound is heard appropriately. (p. 50) →When you are using an S video plug, make sure the red and white plugs of the A/V connecting cable are connected as well. (p. 40)
The sound breaks off.	→Clean the head using the cleaning cassette (optional). (p. 88)
Cannot perform Date search with the recording date displayed on the screen.	→Use a cassette with Cassette Memory. (p. 83) →Set [CM SEARCH] to [ON] in the CM (CM SET) menu. (p. 54) • There is a blank section in the beginning or middle of the tape. This is not a malfunction.
"---" is displayed on the screen.	• The tape you are playing was recorded without setting the date and time. • A blank section on the tape is being played. • The data code on a tape with a scratch or noise cannot be read.
The END SEARCH function does not work.	• The cassette was ejected after recording when using a cassette without Cassette Memory. (p. 83) • The cassette is new and has nothing recorded.
The END SEARCH function does not work correctly.	• There is a blank section in the beginning or middle of the tape. This is not a malfunction.
Noises appear and NTSC is displayed on the screen.	• The tape was recorded in a TV color system other than that of your camcorder. This is not a malfunction. (p. 83)

Dubbing/Editing

Symptom	Cause and/or Corrective Actions
Cannot dub correctly using the A/V connecting cable.	→Make sure your camcorder is connected correctly to the input jack of the other device via the A/V connecting cable. →Set [DISPLAY] to [LCD] in the ETC (OTHERS) menu. (p. 61)
For DCR-PC107E: Pictures from connected devices are not displayed correctly.	• The input signal is not sent correctly except from the PAL system-based device.
New sound added to a recorded tape is not heard.	→In the P (PLAYER SET) menu for DCR-PC106E, or in the V (VCR SET) menu for DCR-PC107E, adjust [AUDIO MIX] from the [ST1] (original sound) side until the sound is heard appropriately. (p. 50)
A title is not recorded/A cassette label is not recorded.	→Use a cassette with Cassette Memory. (p. 83) →Erase unnecessary titles when the Cassette Memory is full. (p. 53) →Set the write-protect tab to REC. (p. 84) • A title cannot be added to a blank section of the tape.
The title is not displayed.	→Set [TITLE DSPL] to [ON] in the CM (CM SET) menu. (p. 53) • During Easy Handycam operation, the title is not displayed.

➡*continued*

Symptom	Cause and/or Corrective Actions
The title cannot be deleted.	➔Set the write-protect tab to REC. (p. 84)
Title search does not work.	➔Enter a title if there is no title on the tape. (p. 52) ➔Use a cassette with Cassette Memory. (p. 83) ➔Set [CM SEARCH] to [ON] in the CM (CM SET) menu. (p. 54) • There is a blank section in the beginning or middle of the tape. This is not a malfunction.
Digital program editing does not function.	➔Set the input selector on the VCR correctly, then check the connection between your camcorder and the VCR. (p. 62) ➔When your camcorder is connected to a DV device that is not a Sony product via an i.LINK cable, select [IR] in step 9 of “Step 1: Preparing your camcorder and VCR for operation” (p. 64). ➔Adjust the synchronization of the VCR. (p. 66) ➔Enter a correct [IR SETUP] code. (p. 66) ➔Select the mode used to cancel recording pause again. (p. 65) ➔Set your camcorder and the VCR more than 30 cm (12 in.) apart. (p. 65) • The program may not be set to a blank section on the tape.
The VCR is not responding properly during Digital program editing when it is connected via an i.LINK cable.	• While connecting via an i.LINK cable, select [IR] in step 9 of “Step 1: Preparing your camcorder and VCR for operation” (p. 64).
The pictures appear distorted or dark.	• A/V connecting cables are connected to both your camcorder and the Handycam Station. ➔Disconnect one of the A/V connecting cables.

Warning indicators and messages

Self-diagnosis display/Warning indicators

If indicators appear on the screen or in the viewfinder, check the following. See the page in parentheses for details.

Indication	Cause and/or Corrective Actions
C:□□:□□/E:□□:□□ (Self-diagnosis display)	Some symptoms can be fixed by yourself. If the problem persists even after you tried a couple of times, contact your Sony dealer or local authorized Sony service facility. **C:04:□□** →A battery pack that is not an "InfoLITHIUM" battery pack is being used. Use an "InfoLITHIUM" battery pack. (p. 85) **C:21:□□** →Moisture condensation has occurred. Remove the cassette and leave your camcorder for at least 1 hour, then re-insert the cassette. (p. 88) **C:22:□□** →Clean the head using a cleaning cassette (optional). (p. 88) **C:31□□ / C:32□□** →Symptoms that are not described above have occurred. Remove and insert the cassette, then operate your camcorder again. Do not perform this procedure if moisture starts to condense. (p. 88) →Remove the power source. Reconnect it again and operate your camcorder again. →Change the tape. →Press the RESET button (p. 94), then operate your camcorder again. **E:61:□□ / E:62:□□** →Contact your Sony dealer or local authorized Sony service facility. Inform them of the 5-digit code, which starts from "E."
(Battery level warning)	• The battery pack is nearly used up. • Depending on the operating, environmental, or battery conditions, may flash, even if there are approximately 5 to 10 minutes remaining.
(Battery Info warning)	• The actual operating time may be considerably shorter than the indicated battery charge level, due to low ambient temperature (p. 14).
(Moisture condensation warning)*	→Eject the cassette, slide the POWER switch up to OFF (CHG), and leave it for about 1 hour with the cassette lid open (p. 88).
(Warning indicator pertaining to the tape)	**Slow flashing:** • There is less than 5 minutes remaining on the tape. • No cassette is inserted.* • The write-protect tab on the cassette is set to lock (p. 84).* **Fast flashing:** • The tape has run out.*

→*continued*

Indication	Cause and/or Corrective Actions
⏏ (Eject cassette warning)*	**Slow flashing:** • The write-protect tab on the cassette is set to lock (p. 84). **Fast flashing:** • Moisture condensation has occurred (p. 88). • The self-diagnosis display code is displayed (p. 79).
ϟ (Warning indicator pertaining to the external flash)	**Slow flashing:** • During charging **Fast flashing:** • The self-diagnosis display code is displayed (p. 79).* • There is something wrong with the external flash (optional).

* You hear a melody or beep sound when the warning indicators appear on the screen.

Warning messages

If messages appear on the screen, check the following. See the page in parentheses for details.

Subjects	Indications	Corrective Actions/References
Battery	Use the "InfoLITHIUM" battery pack.	→See page 85.
	Battery level is low.	→Charge the battery (p. 12).
	Old battery. Use a new one.	→See page 85.
	⏏ Re-attach the power source.	–
Moisture condensation	💧 ⏏ Moisture condensation. Eject the cassette	→See page 88.
	💧 Moisture condensation. Turn off for 1H.	→See page 88.
Cassette/tape	📼 Insert a cassette.	→See page 20.
	⏏ Reinsert the cassette.	→The cassette might be damaged, etc.
	📼 ⏏ The tape is locked - check the tab.	→See page 84.
	📼 The tape has reached the end.	–
	Use a cassette with Cassette Memory.	→See page 83.
	Charging... Cannot record still images.	• You tried to record an image while charging the flash. Wait until the flash charge indicator remains lit.

➡*continued*

Subjects	Indications	Corrective Actions/References
Others	Cannot record due to copyright protection.*	–
	Cannot add audio. Disconnect the i.LINK cable.	→See page 70.
	Not recorded in SP mode. Cannot add audio.	→See page 70.
	Not recorded in 12-bit audio. Cannot add audio.	→See page 70.
	Cannot add audio on the blank portion of a tape.	→See page 70.
	Cassette Memory is full.	→Erase unnecessary titles. (p. 53)
	⊗ Dirty video head. Use a cleaning cassette.	→See page 88.
	Cannot start Easy Handycam	→See page 26, 37.
	Cannot cancel Easy Handycam	→See page 26, 37.
	Cannot start Easy Handycam with USB connected	–
	Invalid button with Easy Handycam operation	→See page 26, 37.
	USB invalid during Easy Handycam	→Touch OK.
	HDV recorded tape. Cannot playback.	→Your camcorder cannot play back this format. Play back the tape with equipment that recorded it.
	HDV recorded tape. Cannot add audio.	→Your camcorder cannot add audio to the scene recorded with the HDV format.
	Cover is not open.	→Open the lens cover.
	Disconnect one AV cable.	→Disconnect one of the A/V connecting cables from either your camcorder or the Handycam Station. • When the A/V connecting cable is connected only to your camcorder, your camcorder is not attached to the Handycam Station correctly. →Attach the Handycam Station correctly.

* For DCR-PC107E

Using your camcorder abroad

Power supply

You can use your camcorder in any countries/regions using the AC Adaptor supplied with your camcorder within AC 100 V to 240 V, 50/60 Hz.

On TV color systems

Your camcorder is a PAL system-based camcorder. If you want to view the playback picture on a TV, it must be a PAL system-based TV (see the following list) with the AUDIO/VIDEO input jack.

System	Used in
PAL	Australia, Austria, Belgium, China, Czech Republic, Denmark, Finland, Germany, Holland, Hong Kong, Hungary, Italy, Kuwait, Malaysia, New Zealand, Norway, Poland, Portugal, Singapore, Slovak Republic, Spain, Sweden, Switzerland, Thailand, United Kingdom, etc.
PAL - M	Brazil
PAL - N	Argentina, Paraguay, Uruguay
SECAM	Bulgaria, France, Guiana, Iran, Iraq, Monaco, Russia, Ukraine, etc.
NTSC	Bahama Islands, Bolivia, Canada, Central America, Chile, Colombia, Ecuador, Guyana, Jamaica, Japan, Korea, Mexico, Peru, Surinam, Taiwan, the Philippines, the U.S.A., Venezuela, etc.

Simple setting of clock by time difference

You can easily set the clock to the local time by setting a time difference when using your camcorder abroad. Select [WORLD TIME] in the ETC (OTHERS) menu, then set the time difference (p. 60).

Usable cassette tapes

You can use the mini DV format cassette only. Use a cassette with the Mini DV mark.

Mini DV Digital Video Cassette is a trademark.

Cassette Memory

There are 2 types of mini DV cassettes: those with Cassette Memory and those without Cassette Memory. Cassettes with Cassette Memory have the CM (Cassette Memory) mark. A cassette with Cassette Memory is recommended for use on your camcorder.

CM Cassette Memory is a trademark.

IC memory is mounted on this type of cassette. Your camcorder can read and write data such as dates of recording or titles from/to this memory. The functions using the Cassette Memory require successive signals recorded on the tape. If the tape has a blank section at the beginning or between recorded sections, titles may not be displayed properly or the search functions may not work properly.

To prevent a blank section from being made on the tape

Touch [END SCH] to go to the end of the recorded section before you begin the next recording in the following cases:

– You have ejected the cassette during recording.
– You have played back the tape.
– You have used the EDIT SEARCH function.

If there is a blank section or discontinuous signals on your tape, re-record from the beginning to the end of the tape as described above.

Note

- The Cassette Memory may not function correctly when you record using a digital video camera recorder that does not support Cassette Memory, on a tape already recorded on using a Cassette Memory-compatible digital video camera recorder.

➡ continued

Tip

- The memory capacity of the cassette marked with CLEAN is 4k bits. Your camcorder can accommodate cassettes having a memory capacity of up to 16k bits.

Copyright signal

When you play back

If the cassette you play back on your camcorder contains copyright signals, you cannot copy it to a tape in another video camera connected to your camcorder.

For DCR-PC107E:

When you record

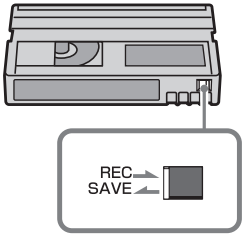
You cannot record software on your camcorder that contains copyright control signals for copyright protection of software.

[Cannot record due to copyright protection.] appears on the LCD screen, or on the TV screen if you try to record such software.
Your camcorder does not record copyright control signals on the tape when it records.

Notes on use

To prevent accidental erasure

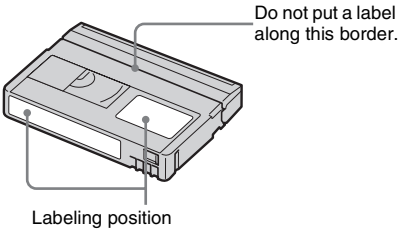
Slide the write-protect tab on the cassette to set to SAVE.



REC: The cassette can be recorded.
SAVE: The cassette cannot be recorded (write-protected).

When labeling the cassette

Be sure to place the label only on the locations as shown in the following illustration so as not to cause malfunction of your camcorder.



After using the cassette

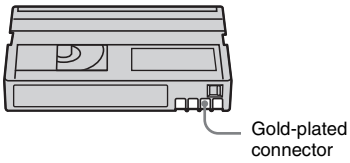
Rewind the tape to the beginning to avoid distortion of the picture or the sound. The cassette should then be put in its case, and stored in an upright position.

When the Cassette Memory function does not work

Re-insert the cassette. Cassette Memory may not work when the gold-plated connector is dirty or dusty.

When cleaning the gold-plated connector

Generally, clean the gold-plated connector on a cassette with a cotton-wool swab after every 10 times it has been ejected.
If the gold-plated connector on the cassette is dirty or dusty, the remaining tape indicator may not be indicated correctly, and you may not be able to operate functions using Cassette Memory.



About the "InfoLITHIUM" battery pack

This unit is compatible with the "InfoLITHIUM" battery pack (F series). Your camcorder operates only with the "InfoLITHIUM" battery pack.
"InfoLITHIUM" F series battery packs have the InfoLITHIUM F SERIES mark.

What is the "InfoLITHIUM" battery pack?

The "InfoLITHIUM" battery pack is a lithium-ion battery pack that has functions for communicating information related to operating conditions between your camcorder and an optional AC Adaptor/charger.
The "InfoLITHIUM" battery pack calculates the power consumption according to the operating conditions of your camcorder, and displays the remaining battery time in minutes.

To charge the battery pack

- Be sure to charge the battery pack before you start using your camcorder.
- We recommend charging the battery pack in an ambient temperature of between 10°C to 30°C (50°F to 86°F) until the CHARGE lamp turns off. If you charge the battery pack outside of this temperature range, you may not be able to charge it efficiently.
- After charging is complete, either disconnect the AC Adaptor from the DC IN jack on your camcorder, remove your camcorder from the Handycam Station or remove the battery pack.

To use the battery pack effectively

- Battery pack performance decreases when the surrounding temperature is 10°C (50°F) or below, and the length of time you can use the battery pack becomes shorter. In that case, do one of the followings to use the battery pack for a longer time.
  - Put the battery pack in a pocket to warm it up, and insert it in your camcorder right before you start taking shots.
  - Use a large capacity battery pack: NP-FF70/FF71 (optional).
- Frequent use of the LCD screen or a frequent playback, fast forward or rewind operation wears out the battery pack faster. We recommend using a large capacity battery pack: NP-FF70/FF71 (optional).
- Be sure to set the POWER switch to OFF (CHG) when not recording or playing back on your camcorder. The battery pack is also consumed when your camcorder is in recording standby or playback pause.
- Have spare battery packs ready for 2 or 3 times the expected recording time, and make trial recordings before making the actual recording.
- Do not expose the battery pack to water. The battery pack is not water resistant.

About remaining battery time indicator

- When the power goes off even though the remaining battery time indicator indicates that the battery pack has enough power to operate, charge the battery pack fully again. The indication on the remaining battery time will be indicated correctly. Note, however, that the battery indication will not be restored if it is used in high temperatures for a long time, or if left in a fully charged state, or when the battery pack is frequently used.
  Use the remaining battery time indication as a guide to the approximate shooting time.
- The mark that indicates low battery flashes even if there are still 5 to 10 minutes of battery time remaining, depending on the operating conditions or ambient temperature and environment.

➡continued

About storage of the battery pack

- If the battery pack is not used for a long time, fully charge the battery pack and use it on your camcorder once a year to maintain the proper function.
  To store the battery pack, remove it from your camcorder and put it in a dry, cool place.
- To completely use up the battery pack on your camcorder, set [A.SHUT OFF] to [NEVER] on the ETC (OTHERS) menu (p. 60) and leave your camcorder in tape recording standby until the power goes off without a cassette inserted.

About battery life

- The battery life is limited. Battery capacity drops little by little as you use it more and more, and as time passes. When the available battery time is shortened considerably, a probable cause is that the battery pack has reached the end of its life. Please buy a new battery pack.
- The battery life varies depending on how it is stored and the operating conditions and environment for each battery pack.

"InfoLITHIUM" is a trademark of Sony Corporation.

About i.LINK

The DV Interface on this unit is an i.LINK-compliant DV Interface. This section describes the i.LINK standard and its features.

What is i.LINK?

i.LINK is a digital serial interface for transferring digital video, digital audio, and other data to other i.LINK-compatible device. You can also control other device using the i.LINK.
i.LINK-compatible device can be connected using an i.LINK cable. Possible applications are operations and data transactions with various digital AV devices.
When 2 or more i.LINK-compatible devices are connected to this unit in a daisy chain, operations and data transactions are possible with not only the device that this unit is connected to but also with other devices via the directly connected device.
Note, however, that the method of operation sometimes varies according to the characteristics and specifications of the device to be connected. Also, operations and data transactions may not be possible on some connected devices.

Note

- Normally, only one device can be connected to this unit with the i.LINK cable. When connecting this unit to i.LINK-compatible device having 2 or more DV Interfaces, refer to the operating instructions of the device to be connected.

Tips

- i.LINK is a more familiar term for the IEEE 1394 data transport bus proposed by Sony, and is a trademark approved by many corporations.
- IEEE 1394 is an international standard standardized by the Institute of Electrical and Electronics Engineers.

About i.LINK Baud rate

i.LINK's maximum baud rate varies according to the device. There are 3 types.

S100 (approx. 100Mbps*)
S200 (approx. 200Mbps)
S400 (approx. 400Mbps)

The baud rate is listed under "Specifications" in the operating instructions of each piece of

device. It is also indicated near the i.LINK interface on some devices.
The maximum baud rate for device that does not have any indication (such as this unit) is "S100."
The baud rate may differ from the indicated value when the unit is connected to device with a different maximum baud rate.

* What is Mbps?
Mbps stands for "megabits per second," or the amount of data that can be sent or received in 1 second. For example, a baud rate of 100 Mbps means that 100 megabits of data can be sent in 1 second.

To use i.LINK functions on this unit

For details on how to dub when this unit is connected to other video device having a DV Interface, see page 62, 63.
This unit can also be connected to other i.LINK (DV Interface) compatible device made by Sony (e.g. a VAIO series personal computer) as well as to video device.
Before connecting this unit to your computer, make sure that application software supported by this unit is already installed on your computer.
Some i.LINK compatible video devices such as Digital Televisions, DVD recorders/players, and MICROMV recorders/players are not compatible with DV device. Before connecting to other device, be sure to confirm whether the device is compatible with DV device or not.
For details on precautions and compatible application software, refer also to the operating instructions for the device to be connected.

About the required i.LINK cable

Use the Sony i.LINK 4-pin-to-4-pin cable (during DV dubbing).

i.LINK and ⁞ are trademarks of Sony Corporation.

Maintenance and precautions

On use and care

- Do not use or store the camcorder and accessories in the following locations.
  - Anywhere extremely hot or cold. Never leave them exposed to temperatures above 60°C (140°F), such as under direct sunlight, near heaters or in a car parked in the sun. They may malfunction or become deformed.
  - Near strong magnetic fields or mechanical vibration. The camcorder may malfunction.
  - Near strong radio waves or radiation. The camcorder may not be able to record properly.
  - Near AM receivers and video equipment. Noise may occur.
  - Sandy beach or anywhere dusty. If sand or dust gets in your camcorder, it may malfunction. Sometimes this malfunction cannot be repaired.
  - Near windows or outdoors, where the LCD screen, the viewfinder, or the lens may be exposed to direct sunlight. This damages the inside of the viewfinder or the LCD screen.
  - Anywhere very humid.
- Operate your camcorder on DC 7.2 V (battery pack) or DC 8.4 V (AC Adaptor).
- For DC or AC operation, use the accessories recommended in these operating instructions.
- Do not let your camcorder get wet, for example, from rain or sea water. If your camcorder gets wet, it may malfunction. Sometimes this malfunction cannot be repaired.
- If any solid object or liquid get inside the casing, unplug your camcorder and have it checked by a Sony dealer before operating it any further.
- Avoid rough handling, disassembling, modifying, or mechanical shock. Be particularly careful of the lens.
- Keep the POWER switch setting to OFF (CHG) when you are not using your camcorder.

➡*continued*

- Do not wrap your camcorder with a towel, for example, and operate it. Doing so might cause heat to build up inside.
- When disconnecting the mains lead, pull by the plug and not the cord.
- Do not damage the mains lead such as by placing anything heavy on it.
- Keep metal contacts clean.
- Keep the Remote Commander and button-type battery out of children's reach. If the battery is accidentally swallowed, consult a doctor immediately.
- If the battery electrolytic liquid has leaked,
  - consult your local authorized Sony service facility.
  - wash off any liquid that may have contacted your skin.
  - if any liquid gets in your eyes, wash with plenty of water and consult a doctor.

When not using your camcorder for a long time

Occasionally turn it on and let it run such as by playing back tapes for about 3 minutes. Otherwise, unplug it from the wall socket.

Moisture condensation

If your camcorder is brought directly from a cold place to a warm place, moisture may condense inside your camcorder, on the surface of the tape, or on the lens. In this state, the tape may stick to the head drum and be damaged or your camcorder may not operate correctly. If there is moisture inside your camcorder, [⏏ Moisture condensation. Eject the cassette] or [Moisture condensation. Turn off for 1H.] appears. The indicator will not appear when the moisture condenses on the lens.

If moisture condensation has occurred

None of the functions except cassette ejection will work. Eject the cassette, turn off your camcorder, and leave it for about 1 hour with the cassette lid open. Your camcorder can be used again if or ⏏ does not appear when the power is turned on again.

If moisture starts to condense, your camcorder sometimes cannot detect condensation. If this happens, the cassette is sometimes not ejected for 10 seconds after the cassette lid is opened. This is not a malfunction. Do not close the cassette lid until the cassette is ejected.

Note on moisture condensation

Moisture may condense when you bring your camcorder from a cold place into a warm place (or vice versa) or when you use your camcorder in a humid place as shown below.

- When you bring your camcorder from a ski slope into a place warmed up by a heating device.
- When you bring your camcorder from an air-conditioned car or room into a hot place outside.
- When you use your camcorder after a squall or a shower.
- When you use your camcorder in a hot and humid place.

How to prevent moisture condensation

When you bring your camcorder from a cold place into a warm place, put your camcorder in a plastic bag and seal it tightly. Remove the bag when the air temperature inside the plastic bag has reached the surrounding temperature (after about 1 hour).

Video head

- When the video head becomes dirty, you cannot record pictures normally, or distorted picture or sound is played back.
- If the following problem occurs, clean the video heads for 10 seconds with the Sony DVM-12CLD cleaning cassette (optional).
  - Mosaic-pattern noise appears on the playback picture or the screen is displayed in blue.

  - Playback pictures do not move.
  - Playback pictures do not appear or the sound breaks off.
  - [Dirty video head. Use a cleaning cassette.] appears on the screen during recording.
- The video head suffers from wear after long use. If you cannot obtain a clear image even after using a cleaning cassette, it might be because the video head is worn. Please contact your Sony dealer or local authorized Sony service facility to have the video head replaced.

LCD screen

- Do not add excessive pressure on the LCD screen, as it may cause damage.
- If your camcorder is used in a cold place, a residual image may appear on the LCD screen. This is not a malfunction.
- While using your camcorder, the back of the LCD screen may heat up. This is not a malfunction.

To clean the LCD screen

If fingerprints or dust make the LCD screen dirty, it is recommended you use the cleaning cloth (supplied) to clean it. When you use the LCD Cleaning Kit (optional), do not apply the cleaning liquid directly to the LCD screen. Use cleaning paper moistened with the liquid.

On adjustment of the LCD screen (CALIBRATION)

The buttons on the touch panel may not work correctly. If this happens, follow the procedure below. It is recommended you connect your camcorder to the wall socket using the supplied AC Adaptor during the operation.

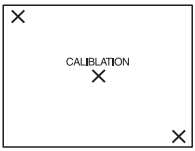
1 **Slide the POWER switch up to OFF (CHG).**

2 **Eject the cassette from your camcorder, then disconnect any connecting cables except the AC Adaptor from your camcorder.**

3 **Slide the POWER switch repeatedly to select the PLAY/EDIT mode while pressing DISPLAY/BATT INFO on your camcorder, then press and hold DISPLAY/BATT INFO for about 5 seconds.**

4 **Touch the "×" displayed on the screen with the corner of the "Memory Stick" or the like.**

The position of the "×" changes.



If you did not press the right spot, start from step 4 again.

Note

- You cannot calibrate the LCD screen if you have rotated the LCD panel and set it with the LCD screen facing out.

Cleaning the casing

- If the casing is soiled, clean the camcorder body with a soft cloth lightly moistened with water, and then wipe the casing with a dry soft cloth.
- Avoid the following to avoid damage to the finish.
  - Using chemicals such as thinner, benzine, alcohol, chemical cloths, repellent and insecticide.
  - Handling with above substances on your hands.
  - Leaving the case in contact with rubber or vinyl objects for a long period of time.

About care and storage of the lens

- Wipe the surface of the lens clean with a soft cloth in the following instances:
  - When there are fingerprints on the lens surface.
  - In hot or humid locations
  - When the lens is exposed to salty air such as at the seaside.
- Store in a well-ventilated location subject to little dirt or dust.
- To prevent molds periodically clean the lens as described above.

It is recommended you operate your camcorder about once a month to keep it in an optimum state for a long time.

To charge the pre-installed button-type battery

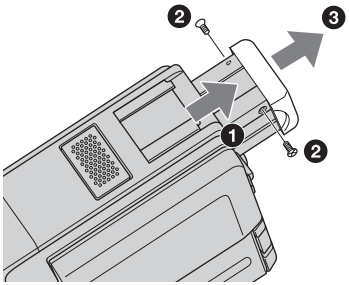
Your camcorder has a pre-installed button-type battery to retain the date, time, and other settings even when the POWER switch is set to OFF (CHG). The pre-installed button-type battery is always charged while you are using your camcorder but it will get discharged gradually if you do not use your camcorder. The button-type battery will be fully discharged in about **3 months** if you do not use your camcorder at all. However, even if the pre-installed button-type battery is not charged, the camcorder operation will not be affected as long as you are not recording the date.

➡*continued*

Procedures

Connect your camcorder to a wall socket using the supplied AC Adaptor, and leave it with the POWER switch set to OFF (CHG) for more than 24 hours.

Removing dust from inside the viewfinder



1 Remove the eyecup.

❶ Pull out the viewfinder.

❷ Remove the screw on each side of the eyecup and viewfinder using a screwdriver.

❸ Remove the eyecup.

2 Remove dust from inside the eyecup and viewfinder with a blower.

3 Reverse steps ❷ and ❸ to re-attach the eyecup and replace the screws.

Note

- Do not drop or bend the eyecup shaft. Be careful when handling the eyecup.

Specification

Video camera recorder

System

Video recording system
2 rotary heads, Helical scanning system

Audio recording system
Rotary heads, PCM system
Quantization: 12 bits (Fs 32 kHz, stereo 1, stereo 2), 16 bits (Fs 48 kHz, stereo)

Video signal
PAL color, CCIR standards

Usable cassette
Mini DV cassette with the Mini DV mark printed

Tape speed
SP: Approx. 18.81 mm/s
LP: Approx. 12.56 mm/s

Recording/playback time (using a DVM60 cassette)
SP: 60 min
LP: 90 min

Fast forward/rewind time (using a DVM60 cassette)
Approx. 2 min 40 s

Viewfinder
Electric viewfinder (black and white)

Image device
3 mm (1/6 type) CCD (Charge Coupled Device)
Gross: Approx. 800 000 pixels
Effective (movie): Approx. 400 000 pixels

Lens
Carl Zeiss Vario Tessar
Combined power zoom lens
Filter diameter: 25 mm (1 in.)
10 × (Optical), 120 × (Digital)
F = 1.7 ~ 2.3

Focal length
2.3 - 23 mm (3/32 - 29/32 in.)
When converted to a 35 mm still camera
In CAMERA:
43 - 430 mm (1 3/4 - 17 in.)

Color temperature
[AUTO], [ONE PUSH], [INDOOR] (3 200 K), [OUTDOOR] (5 800 K)

Minimum illumination

5 lx (lux) (F 1.7)
0 lx (lux) (during the NightShot plus function)*
* Objects unable to be seen due to the dark can be shot with infrared lighting.

Input/Output connectors

Audio/Video output

AV MINI JACK
Video signal: 1 Vp-p, 75 Ω (ohms), unbalanced, sync negative
Audio signal: 327 mV (at output impedance more than 47 kΩ (kilohms)), Output impedance with less than 2.2 kΩ (kilohms)

LANC jack

Stereo mini-minijack (ø 2.5 mm)

MIC jack

Minijack, 0.388 mV low impedance with DC 2.5 to 3.0 V, output impedance 6.8 kΩ (kilohms) (ø 3.5 mm), Stereo type

LCD screen

Picture

6.2 cm (2.5 type)

Total dot number

123 200 (560 × 220)

General

Power requirements

DC 7.2 V (battery pack)
DC 8.4 V (AC Adaptor)

Average power consumption (when using the battery pack)

During camera recording using the viewfinder 2.2 W
During camera recording using the LCD 2.5 W

Operating temperature

0° C to 40° C (32° F to 104° F)

Storage temperature

-20° C to + 60° C (-4° F to + 140° F)

Dimensions (approx.)

50 × 95 × 97 mm (2 × 3 3/4 × 3 7/8 in.) (w/h/d)

Mass (approx.)

375 g (13 oz) main unit only
440 g (15 oz) including the NP-FF51 rechargeable battery pack and DVM60 cassette.

Supplied accessories

See page 11.

Handycam Station DCR-PC107E: DCRA-C112 DCR-PC106E: DCRA-C113

S video output

4-pin mini DIN
Luminance signal: 1 Vp-p, 75 Ω (ohms), unbalanced
Chrominance signal: 0.3 Vp-p, 75 Ω (ohms), unbalanced

Audio/Video output

AV MINI JACK
Video signal: 1 Vp-p, 75 Ω (ohms), unbalanced, sync negative
Audio signal: 327 mV, (at output impedance more than 47 kΩ (kilohms))
Output impedance with less than 2.2 kΩ (kilohms)

USB jack

mini-B

DV input (For DCR-PC107E)/output

4-pin connector

AC Adaptor AC-L25A/L25B

Power requirements

AC 100 - 240 V, 50/60 Hz

Current consumption

0.35 - 0.18 A

Power consumption

18 W

Output voltage

DC 8.4 V, 1.5 A

Operating temperature

0° C to 40° C (32° F to 104° F)

Storage temperature

-20° C to + 60° C (-4° F to + 140° F)

Dimensions (approx.)

56 × 31 × 100 mm (2 1/4 × 1 1/4 × 4 in.) (w/h/d) excluding the projecting parts

Mass (approx.)

190 g (6.7 oz) excluding the mains lead

Rechargeable battery pack (NP-FF51)

Maximum output voltage

DC 8.4 V

Output voltage

DC 7.2 V

Capacity

5.6 Wh (780 mAh)

Dimensions (approx.)

40.8 × 12.5 × 49.1 mm
(1 5/8 × 1/2 × 1 15/16 in.) (w/h/d)

Mass (approx.)

➡ *continued*

45 g (1.6 oz)

Operating temperature

0°C to 40°C (32°F to 104°F)

Type

Lithium ion

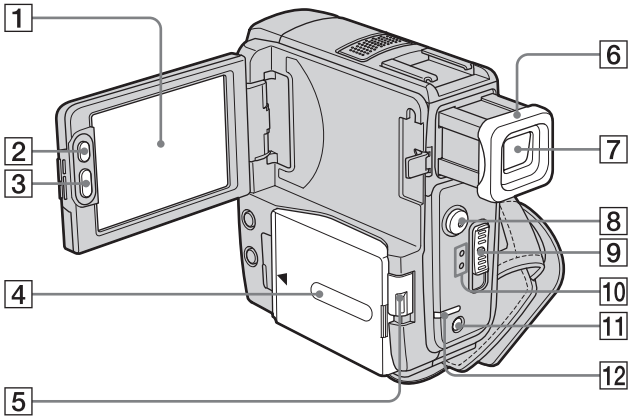
Design and specifications are subject to change without notice.

Types of differences

DCR-PC	106E	107E
DV Interface	OUT	IN/OUT

Identifying parts and controls

Camcorder



1 **LCD/Touch panel screen (p. 2, 17)**

2 **LCD BACKLIGHT button* (p. 17)**

3 **REC START/STOP button (p. 22)**

4 **Battery pack/Battery terminal cover (p. 12)**

5 **BATT (battery release) lever (p. 13)**

6 **Eyecup (p. 90)**

7 **Viewfinder (p. 2, 17)**

8 **REC START STOP button (p. 22)**

9 **POWER switch (p. 16)**

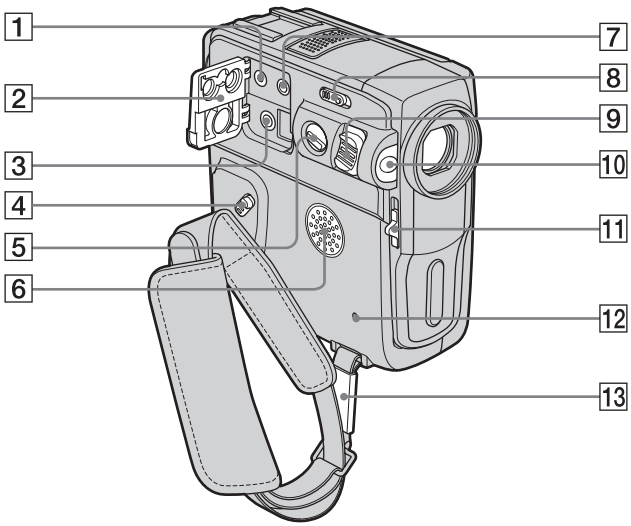
10 **CAMERA, PLAY/EDIT mode lamps (p. 16)**

11 **BACK LIGHT button* (p. 27)**

12 **CHARGE lamp (p. 13)**

* These buttons are not available during Easy Handycam operation. (There is the ● mark.)

continued



1 **(LANC) jack (blue)**
The LANC control jack is used for controlling the tape transport of video device and peripherals connected to it.

2 **Jack cover**

3 **A/V OUT jack (yellow) (p. 62)**

4 **Belt lock release lever**

5 **PHOTO button (p. 25)**

6 **Speaker**

7 **MIC (PLUG IN POWER) jack (red) (p. 70)**
This jack works as an input for an external microphone as well as a power-supply jack for a plug-in-power microphone. When the external microphone is connected, it takes precedence.

8 **NIGHTSHOT PLUS switch (p. 30)**

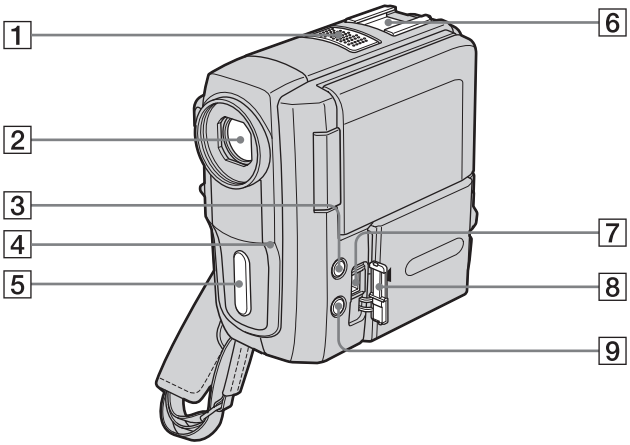
9 **Power zoom lever**

10 **Infrared ray emitter (p. 65)**

11 **LENS COVER switch**

12 **RESET button**
If you press RESET, all the settings including the date and time, return to the default.

13 **Finger rest**



1 **Microphone (p. 70)**

2 **Lens (Carl Zeiss Lens)/Lens cover**
Your camcorder is equipped with a Carl Zeiss lens which can reproduce fine images. The lens for your camcorder was developed jointly by Carl Zeiss, in Germany, and Sony Corporation. It adopts the MTF measurement system for video cameras and offers a quality as fine as a Carl Zeiss lens. MTF stands for Modulation Transfer Function. The value number indicates the amount of light from a subject coming into the lens.

3 **EASY button (p. 26, 37)**

4 **Camera recording lamp (p. 22)**

5 **Remote sensor**

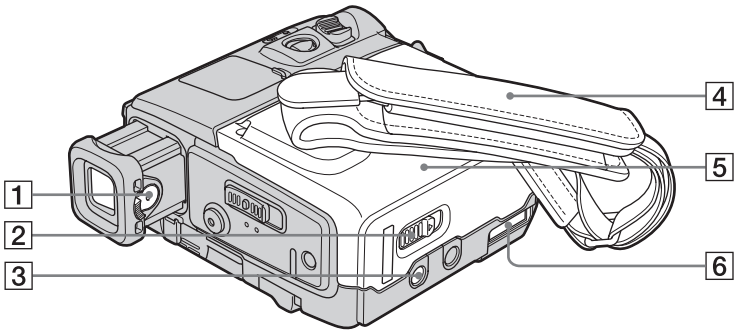
6 **Accessory shoe**
The accessory shoe has a safety device for fixing the installed accessory securely. To connect an accessory, press down and push it to the end, and then tighten the screw. To remove an accessory, loosen the screw, and then press down and pull out the accessory.

7 **DC IN jack (p. 12)**

8 **DC IN jack cover**

9 **DISPLAY/BATT INFO button (p. 14, 38)**

➡ *continued*



1 **Viewfinder lens adjustment lever (p. 17)**

2 **OPEN/⏏EJECT ⊿ lever (p. 20)**

3 **Tripod receptacle**
Make sure that the length of the tripod screw is less than 5.5 mm (7/32 inch). Otherwise, you cannot attach the tripod securely, and the screw may damage your camcorder.

4 **Strap Belt**

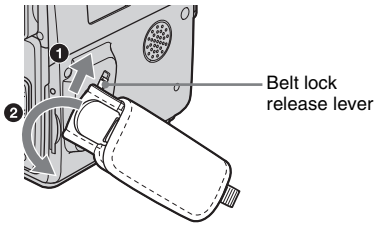
5 **Cassette lid (p. 20)**

6 **Interface connector**

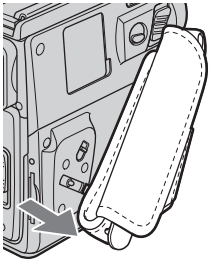
Using the Strap Belt as a wrist strap

This is useful for carrying your camcorder.

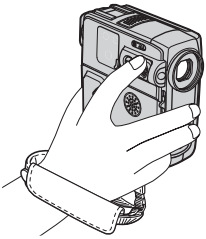
1 Slide and hold the belt lock release lever in the direction of the arrow (❶), then move the Strap Belt attachment in the direction of the arrow (❷).



2 Detach the Strap Belt attachment from your camcorder.

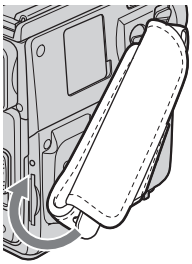


3 Use the Strap Belt as a wrist strap as illustrated.



To attach the Strap Belt

Insert the Strap Belt attachment to your camcorder and move it in the direction of the arrow until it clicks and is locked.



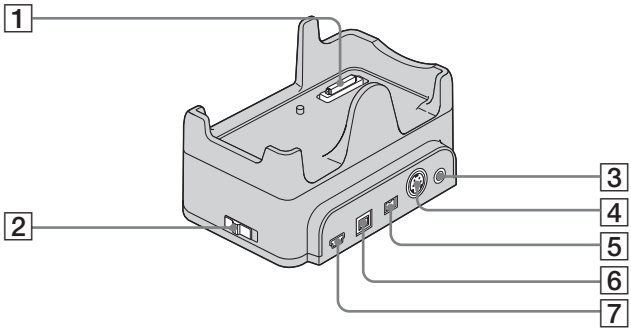
Note

- The Strap Belt may detach accidentally if not attached properly.

Tip

- The length of the Strap Belt is adjustable. (p. 3)

Handycam Station



1 **Interface connector**

2 **(USB) ON/OFF switch**
Set the (USB) ON/OFF switch to ON while using the USB connection.

3 **A/V OUT jack (p. 62)**

4 **S VIDEO OUT jack**

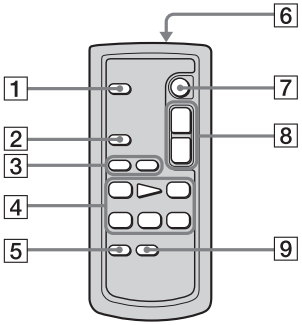
5 **DC IN jack (p. 12)**

6 **For DCR-PC106E:**
DV OUT Interface (p. 62)
For DCR-PC107E:
DV Interface (p. 62)

7 **(USB) jack**

Remote Commander

Remove the insulation sheet before using the Remote Commander.



1 **PHOTO button (p. 25)**

2 **SEARCH M. button* (p. 41)**

3 **I◄◄ /►►I buttons* (p. 41)**

4 **Video control buttons (Rewind, Playback, Fast-forward, Pause, Stop, Slow) (p. 36)**

5 **ZERO SET MEMORY button* (p. 41)**

6 **Transmitter**
After turning on your camcorder, point towards the remote sensor to control your camcorder.

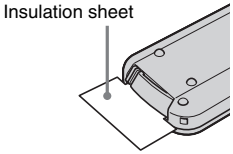
7 **REC START/STOP button (p. 24)**

8 **Power zoom button (p. 23)**

9 **DISPLAY button (p. 41)**

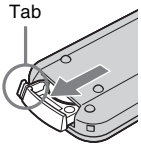
* These buttons are not available during Easy Handycam operation.

To remove the insulation sheet

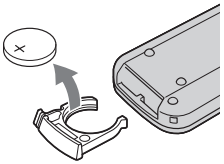


To change the button-type battery

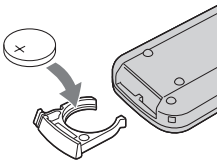
1 While pressing on the tab, insert your fingernail into the slit to pull out the battery case.



2 Remove the button-type lithium battery.



3 Place a new button-type lithium battery with the + side facing up.



4 Insert the battery case back into the Remote Commander until it clicks.

➡ *continued*

WARNING

Battery may explode if mistreated. Do not recharge, disassemble or dispose of in fire.

CAUTION

Danger of explosion if battery is incorrectly replaced.
Replace only with the same or equivalent type recommended by the manufacturer.
Discard used batteries according to the manufacturer's instructions.

Notes on the Remote Commander

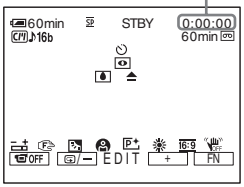
- A button-type lithium battery (CR2025) is used in the Remote Commander. Do not use batteries other than CR2025.
- Point the remote sensor away from strong light sources such as direct sunlight or overhead lighting. Otherwise, the Remote Commander may not function properly.
- The Remote Commander may not function properly when the remote sensor is obstructed with a conversion lens (optional).
- When you are operating with the Remote Commander supplied with your camcorder, your VCR may also operate. In that case, select a commander mode other than VTR 2 for your VCR, or cover the sensor of your VCR with black paper.

Indicators for the LCD screen and viewfinder

Following indicators will appear on the LCD screen and viewfinder to indicate the state of your camcorder. Indicators vary depending on your camcorder model.

Example: Indicators in the CAMERA mode

Time code (p. 22)/Tape counter (p. 22)/Self-diagnosis (p. 79)



Indicators	Meanings
60min	Remaining battery (p. 22)
SP LP	Recording mode (p. 23)
STBY REC	Recording standby/ recording mode
	Cassette Memory (p. 83)
♪16b	Audio mode (p. 55)
60min	Remaining tape (p. 22)
	Self-timer recording (p. 24)
	Tape photo recording (p. 25)
	Frame recording (p. 55)
	Interval recording (p. 56)
DV IN	DV input (p. 64)
→0←	Zero set memory (p. 41)
	NightShot plus (p. 30)
	Warning (p. 79)
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Revision History

Ver.	Date	History	Contents	S.M. Rev. issued
1.0	2004.03	Official Release	—	—

DCR-PC106E/PC107E

RMT-830

SERVICE MANUAL

LEVEL 2

Ver 1.0 2004. 03
Revision History

How to use
Acrobat Reader

Photo : DCR-PC107E

DCR-PC106E/PC107E
AEP Model
UK Model
DCR-PC106E
East European Model
DCR-PC107E
North European Model

Z (Z200) MECHANISM

Link

SPECIFICATIONS	BLOCK DIAGRAMS	PRINTED WIRING BOARDS
SERVICE NOTE	FRAME SCHEMATIC DIAGRAMS	REPAIR PARTS LIST
DISASSEMBLY	SCHEMATIC DIAGRAMS	

- For ADJUSTMENTS (SECTION 6), refer to SERVICE MANUAL, ADJ (987670751.pdf).
- For INSTRUCTION MANUAL, refer to SERVICE MANUAL, LEVEL 1 (987670741.pdf).
- For MECHANISM ADJUSTMENTS, refer to the “DV MECHANICAL ADJUSTMENT MANUAL Ⅷ Z (Z200) MECHANISM ” (9-876-724-11).
- Reference number search on printed wiring boards is available.
- TO TAKE OUT A CASSETTE WHEN NOT EJECT (FORCE EJECT)

On the VC-350 board

This service manual provides the information that is premised the circuit board replacement service and not intended repair inside the VC-350 board.
Therefore, schematic diagram, printed wiring board, mounted parts location and electrical parts list of the VC-350 board are not shown.
The following pages are not shown.

Schematic diagram	Pages 4-23 to 4-48	Mounted parts location	Pages 4-75 to 4-77
Printed wiring board	Pages 4-63 to 4-70	Electrical parts list	Pages 5-16 to 5-22

Mini DV Digital Video Cassette

DIGITAL VIDEO CAMERA RECORDER

SONY

HANDYCAM InfoLITHIUM F SERIES

SPECIFICATIONS

Video camera recorder

System

Video recording system
2 rotary heads, Helical scanning system
Audio recording system
Rotary heads, PCM system
Quantization: 12 bits (Fs 32 kHz, stereo 1, stereo 2), 16 bits (Fs 48 kHz, stereo)
Video signal
PAL color, CCIR standards
Usable cassette
Mini DV cassette with the Mini DV mark printed
Tape speed
SP: Approx. 18.81 mm/s
LP: Approx. 12.56 mm/s
Recording/playback time (using a DVM60 cassette)
SP: 60 min
LP: 90 min
Fast forward/rewind time (using a DVM60 cassette)
Approx. 2 min 40 s
Viewfinder
Electric viewfinder (black and white)
Image device
3 mm (1/6 type) CCD (Charge Coupled Device)
Gross: Approx. 800 000 pixels
Effective (movie): Approx. 400 000 pixels
Lens
Carl Zeiss Vario Tessar
Combined power zoom lens
Filter diameter: 25 mm (1 in.)
10× (Optical), 120× (Digital)
F = 1.7 ~ 2.3
Focal length
2.3 - 23 mm (3/32 - 29/32 in.)
When converted to a 35 mm still camera
In CAMERA:
43 - 430 mm (1 3/4 - 17 in.)
Color temperature
[AUTO], [ONE PUSH], [INDOOR] (3 200 K), [OUTDOOR] (5 800 K)
Minimum illumination
5 lx (lux) (F 1.7)
0 lx (lux) (during the NightShot plus function)*
* Objects unable to be seen due to the dark can be shot with infrared lighting.

Input/Output connectors

Audio/Video output
AV MINI JACK
Video signal: 1 Vp-p, 75Ω (ohms), unbalanced, sync negative
Audio signal: 327 mV (at output impedance more than 47 kΩ (kilohms)), Output impedance with less than 2.2 kΩ (kilohms)
LANC jack
Stereo mini-minijack (ø 2.5 mm)
MIC jack
Minijack, 0.388 mV low impedance with DC 2.5 to 3.0 V, output impedance 6.8 kΩ (kilohms) (ø 3.5 mm), Stereo type

LCD screen

Picture
6.2 cm (2.5 type)
Total dot number
123 200 (560 × 220)

General

Power requirements
DC 7.2 V (battery pack)
DC 8.4 V (AC Adaptor)
Average power consumption (when using the battery pack)
During camera recording using the viewfinder
2.2 W
During camera recording using the LCD
2.5 W
Operating temperature
0° C to 40° C (32° F to 104° F)
Storage temperature
-20° C to + 60° C (-4° F to + 140° F)
Dimensions (approx.)
50 × 95 × 97 mm (2 × 3 3/4 × 3 7/8 in.) (w/h/d)
Mass (approx.)
375 g (13 oz) main unit only
440 g (15 oz) including the NP-FF51 rechargeable battery pack and DVM60 cassette.
Supplied accessories
See page 5-12.

Handycam Station
DCR-PC107E: DCRA-C112
DCR-PC106E: DCRA-C113

S video output
4-pin mini DIN
Luminance signal: 1 Vp-p, 75Ω (ohms), unbalanced
Chrominance signal: 0.3 Vp-p, 75Ω (ohms), unbalanced
Audio/Video output
AV MINI JACK
Video signal: 1 Vp-p, 75Ω (ohms), unbalanced, sync negative
Audio signal: 327 mV, (at output impedance more than 47 kΩ (kilohms))
Output impedance with less than 2.2 kΩ (kilohms)
USB jack
mini-B
DV input (For DCR-PC107E)/output
4-pin connector

AC Adaptor AC-L25A/L25B

Power requirements
AC 100 - 240 V, 50/60 Hz
Current consumption
0.35 - 0.18 A
Power consumption
18 W
Output voltage
DC 8.4 V, 1.5 A
Operating temperature
0° C to 40° C (32° F to 104° F)
Storage temperature
-20° C to + 60° C (-4° F to + 140° F)
Dimensions (approx.)
56 × 31 × 100 mm (2 1/4 × 1 1/4 × 4 in.) (w/h/d) excluding the projecting parts
Mass (approx.)
190 g (6.7 oz) excluding the mains lead

Rechargeable battery pack (NP-FF51)

Maximum output voltage
DC 8.4 V
Output voltage
DC 7.2 V
Capacity
5.6 Wh (780 mAh)
Dimensions (approx.)
40.8 × 12.5 × 49.1 mm
(1 5/8 × 1/2 × 1 15/16 in.) (w/h/d)
Mass (approx.)
45 g (1.6 oz)
Operating temperature
0°C to 40°C (32°F to 104°F)
Type
Lithium ion

Design and specifications are subject to change without notice.

Types of differences

DCR-PC	106E	107E
DV Interface	OUT	IN/OUT

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer.

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.
3. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
4. Look for parts which, through functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
5. Check the B+ voltage to see it is at the values specified.
6. Flexible Circuit Board Repairing
   - Keep the temperature of the soldering iron around 270˚C during repairing.
   - Do not touch the soldering iron on the same conductor of the circuit board (within 3 times).
   - Be careful not to apply force on the conductor when soldering or unsoldering.

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

CAUTION :
Danger of explosion if battery is incorrectly replaced.
Replace only with the same or equivalent type.

Unleaded solder

Boards requiring use of unleaded solder are printed with the lead-free mark (LF) indicating the solder contains no lead.
(Caution: Some printed circuit boards may not come printed with the lead free mark due to their particular size.)

: LEAD FREE MARK

Unleaded solder has the following characteristics.

- Unleaded solder melts at a temperature about 40°C higher than ordinary solder.
  Ordinary soldering irons can be used but the iron tip has to be applied to the solder joint for a slightly longer time.
  Soldering irons using a temperature regulator should be set to about 350°C.
  Caution: The printed pattern (copper foil) may peel away if the heated tip is applied for too long, so be careful!
- Strong viscosity
  Unleaded solder is more viscous (sticky, less prone to flow) than ordinary solder so use caution not to let solder bridges occur such as on IC pins, etc.
- Usable with ordinary solder
  It is best to use only unleaded solder but unleaded solder may also be added to ordinary solder.

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Shematic diagram of the VC-350 board is not shown.
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Printed wiring board of the VC-350 board is not shown.
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Mounted parts location of the VC-350 board is not shown.
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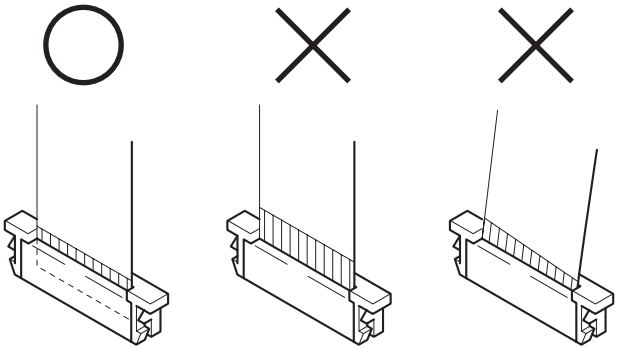
Electrical parts list of the VC-350 board is not shown.
Pages from 5-16 to 5-22 are not shown.

SECTION 1
SERVICE NOTE

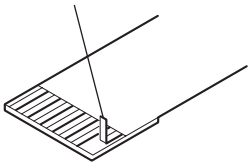
1-1. SERVICE NOTE

1. NOTE FOR REPAIR

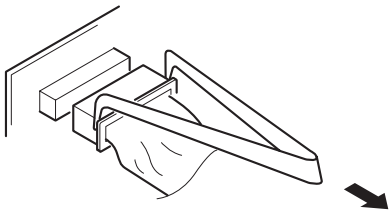
Make sure that the flat cable and flexible board are not cracked of bent at the terminal.
Do not insert the cable insufficiently nor crookedly.



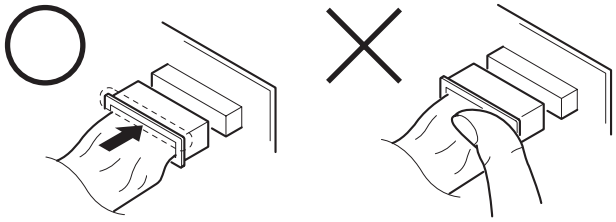
Cut and remove the part of gilt which comes off at the point. (Take care that there are some pieces of gilt left inside)



When remove a connector, don't pull at wire of connector. Be in danger of the snapping of a wire.



When installing a connector, don't press down at wire of connector. Be in danger of the snapping of a wire.



2. POWER SUPPLY DURING REPAIRS

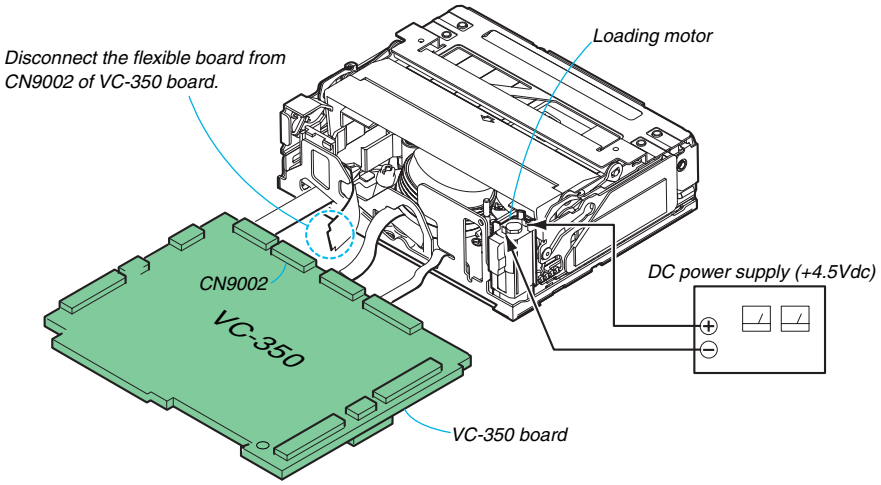
In this unit, about 10 seconds after power is supplied to the battery terminal using the regulated power supply (8.4V), the power is shut off so that the unit cannot operate.
This following two methods are available to prevent this. Take note of which to use during repairs.

Method 1.
Use the AC power adaptor.

Method 2.
Connect the servicing remote commander RM-95 (J-6082-053-B) to the LANC jack, and set the commander switch to the “ADJ” side.

3. TO TAKE OUT A CASSETTE WHEN NOT EJECT (FORCE EJECT)

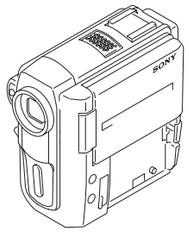
① Remove the front panel section and cabinet (R) section.
② Remove the cabinet (upper) (G) assembly.
③ Remove the lens section.
④ Remove the rear panel assembly and control switch block (SS6800).
⑤ Remove the EVF section.
⑥ Open the VC-350 board.
⑦ Remove the mechanism deck and the VC-350 board.
⑧ Disconnect CN9002 (27P, 0.3mm) of VC-350 board.
⑨ Supply +4.5V from the DC power supply to the loading motor and unload with pressing the cassette compartment.

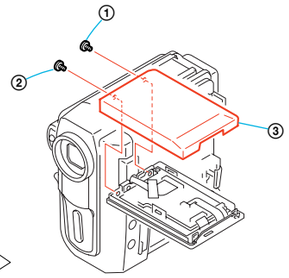


SECTION 2
DISASSEMBLY

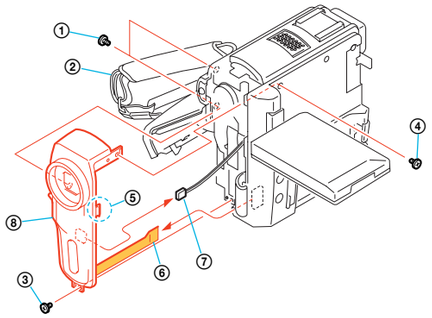
The following flow chart shows the disassembly procedure.

2-1. DISASSEMBLY

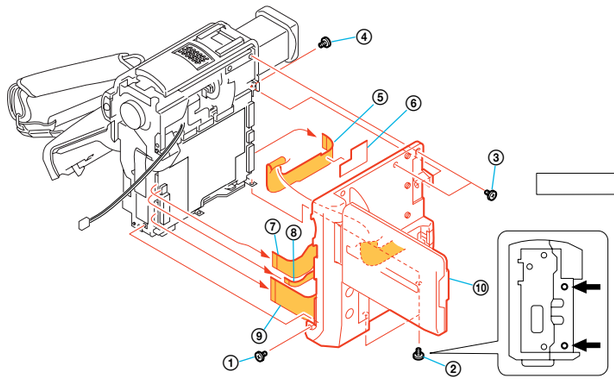




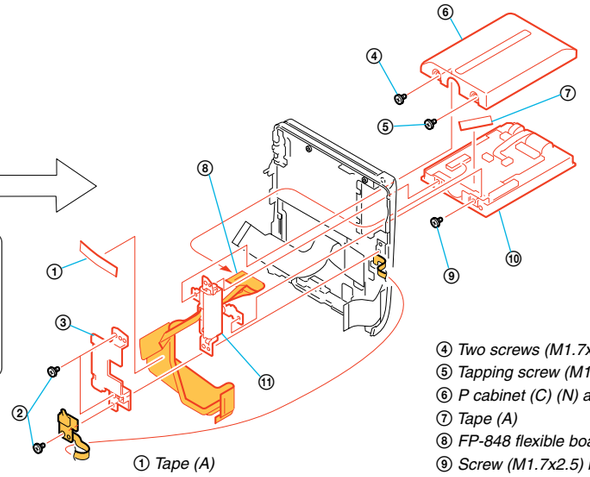
① Screw (M1.7x3) black
② Tapping screw (M1.7x3.5) black
③ P cabinet (C) (N) assembly



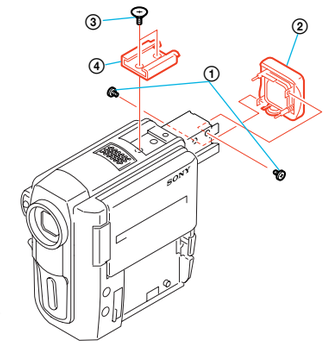
① Two screws (M1.7x4) silver
② Open the cassette lid.
③ Screw (M1.7x2.5) silver
④ Screw (M1.7x4) silver
⑤ Claw
⑥ FP-840 board (16P)
⑦ Harness (RR-057) (2P)
⑧ Front panel assembly (N)



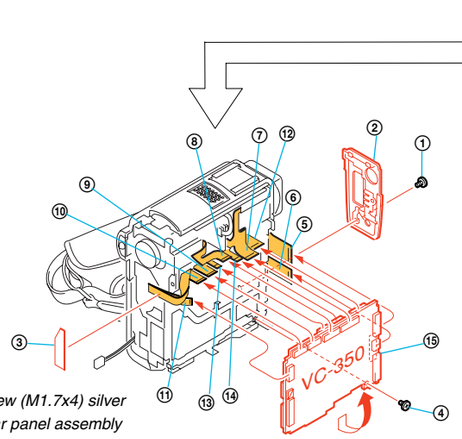
① Screw (M1.7x2.5) silver
② Two screws (M1.7x4) silver
③ Two screws (M1.7x4) silver
④ Screw (M1.7x4) silver
⑤ FP-841 flexible board (26P)
⑥ BT flexible adhesive sheet
⑦ FP-848 flexible board (22P)
⑧ FP-926 flexible board (6P)
⑨ FP-846 flexible board (51P)
⑩ Cabinet (R) section



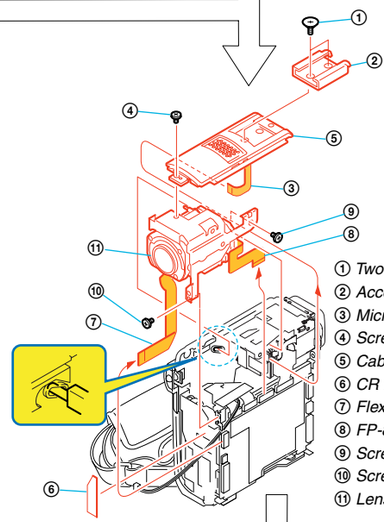
① Tape (A)
② Three tapping screws (M1.7x5) black
③ Hinge blind
④ Two screws (M1.7x3) black
⑤ Tapping screw (M1.7x3.5) black
⑥ P cabinet (C) (N) assembly
⑦ Tape (A)
⑧ FP-848 flexible board (22P)
⑨ Screw (M1.7x2.5) black
⑩ LCD panel section
⑪ Hinge section



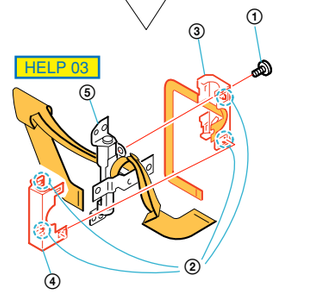
① Two screws (M1.4x2) black
② Eye cup assembly
③ Two screws (M2x2.5) silver
④ Accessory shoe



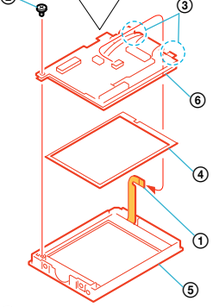
① Screw (M1.7x4) silver
② Rear panel assembly
③ CR insulating sheet
④ Screw (M1.7x2.5) silver
⑤ to ⑭ (CN9301 (20P), CN1001 (18P), CN1005 (20P), CN3001 (14P), CN9002 (27P), CN9003 (27P), CN3101 (23P), CN1008 (39P), CN9001 (10P),CN6501 (10P)) of VC-350 board.
⑮ VC-350 board



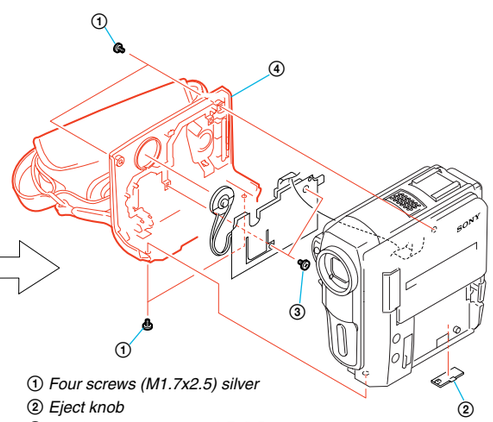
① Two screws (M2x2.5) silver
② Accessory shoe
③ Microphone unit (960H) (6P)
④ Screw (M1.7x2.5) silver
⑤ Cabinet (upper) (N) assembly
⑥ CR insulating sheet
⑦ Flexible board (from lens device) (23P)
⑧ FP-838 flexible board (14P)
⑨ Screw (M1.7x2.5) silver
⑩ Screw (M1.7x2.5) silver
⑪ Lens block assembly



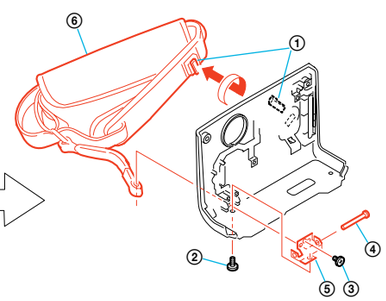
① Screw (M1.7 × 2.5) silver
② Four claws
③ Hinge cover (M), FP-926 flexible board
④ Hinge cover (C)
⑤ FP-848 flexible board, Hinge (63) assembly



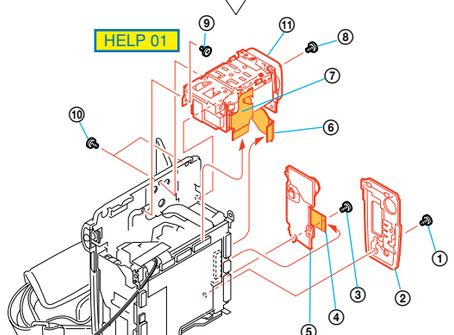
① Control key block (SB6800) (6P)
② Tapping screw (M1.7x5) black
③ Two claws
④ TP cushion
⑤ P cabinet (M) assembly
⑥ PD-213 board, LCD unit (ACX528AKP-J), Light guide plate block



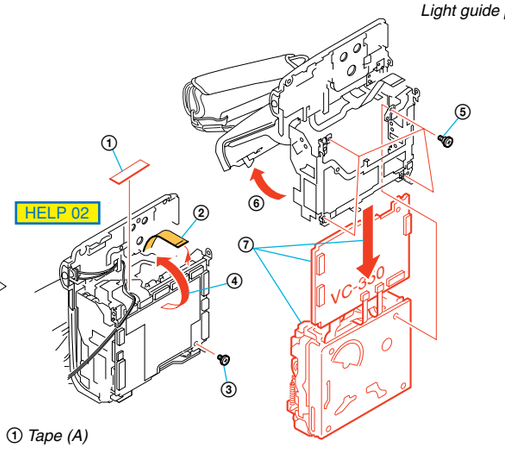
① Four screws (M1.7x2.5) silver
② Eject knob
③ Two tapping screws (M1.7x3.5) black
④ Cabinet (G) section



① Release the lock
② Screw (M1.7x2.5) silver
③ Tapping screw (M1.7x3.5) black
④ Belt shaft
⑤ Belt bracket (front)
⑥ Grip belt assembly

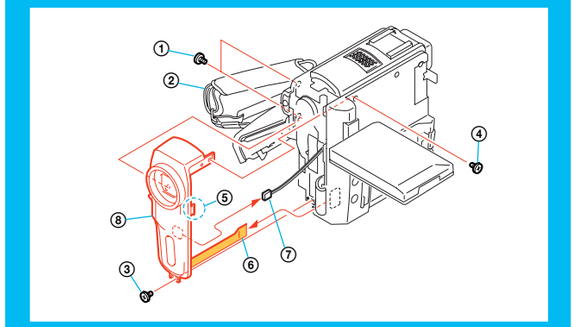


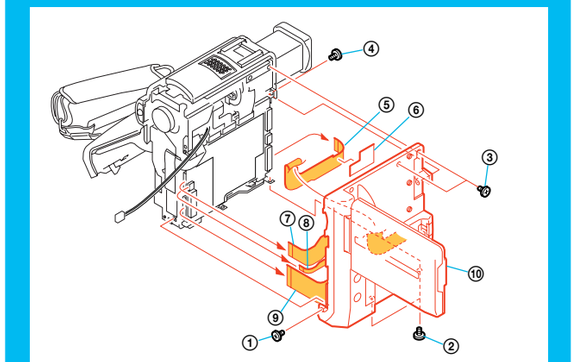
① Screw (M1.7x4) silver
② Rear panel assembly
③ Screw (M1.7x2.5) silver
④ Control key block (SS6800) (18P)
⑤ Control key block (SS6800)
⑥ FP-842 flexible board (20P)
⑦ FP-843 flexible board (39P)
⑧ Screw (M1.7x4) silver
⑨ Tapping screw (M1.7x3.5) black
⑩ Two screws (M1.7x4) silver
⑪ EVF section

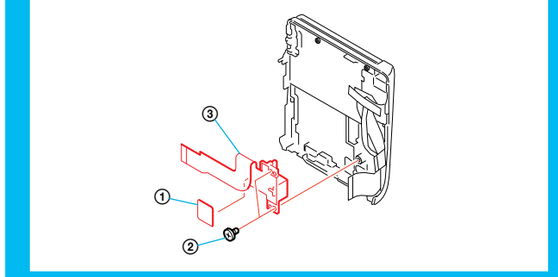


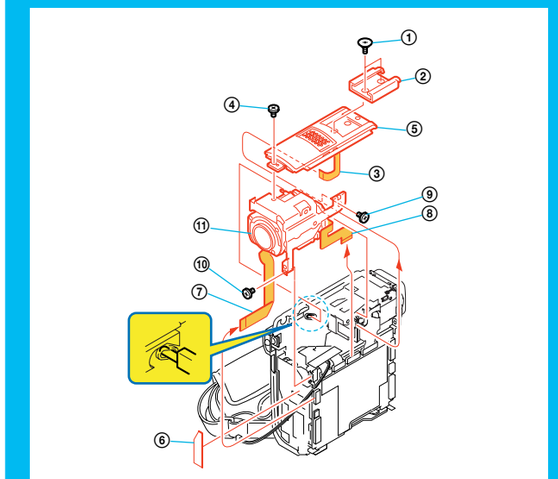
① Tape (A)
② FP-844 flexible board (20P)
③ Screw (M1.7x2.5) silver
④ Return the VC-350 board.
⑤ Four screws (M1.4x1.5) silver
⑥ Open the cassette lid.
⑦ VC-350 board, Mechanism deck.

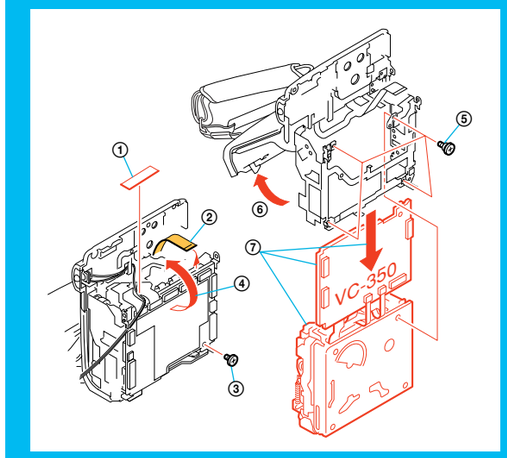
2-2. SERVICE POSITION

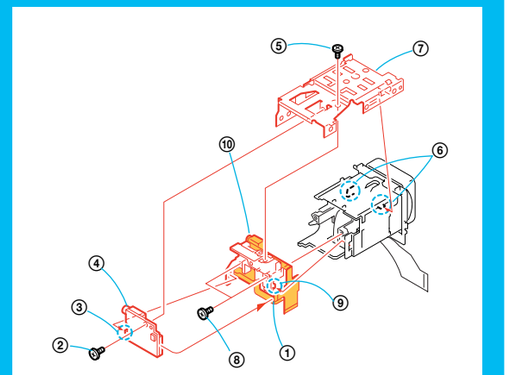


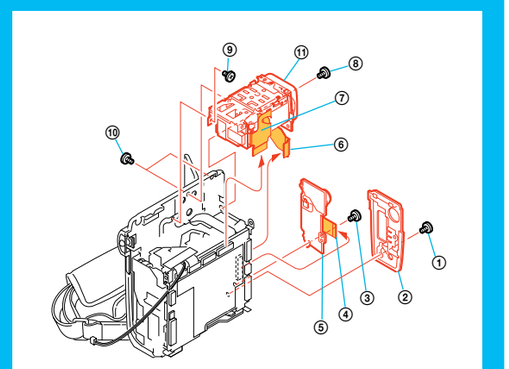








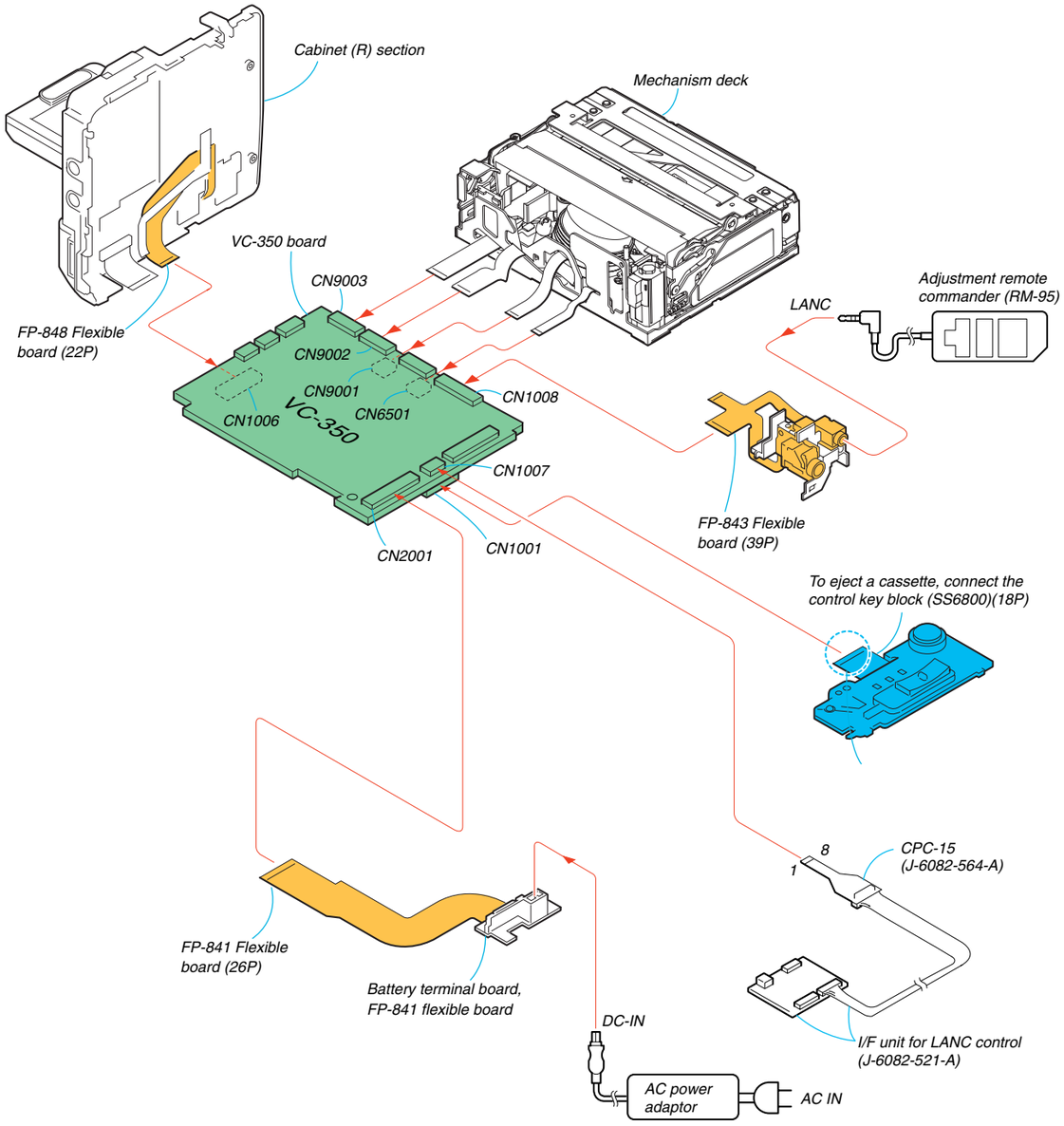




[SERVICE POSITION TO CHECK THE VTR SECTION]
Connection to Check the VTR Section
To check the VTR section, set the VTR to the "Forced VTR power ON" mode.
Operate the VTR functions using the touch panel. (When the control switch block (ZM6800) is removed, the function buttons of the adjustment remote commander are not effective even if the HOLD switch of the adjustment remote commander is set to the OFF position.)

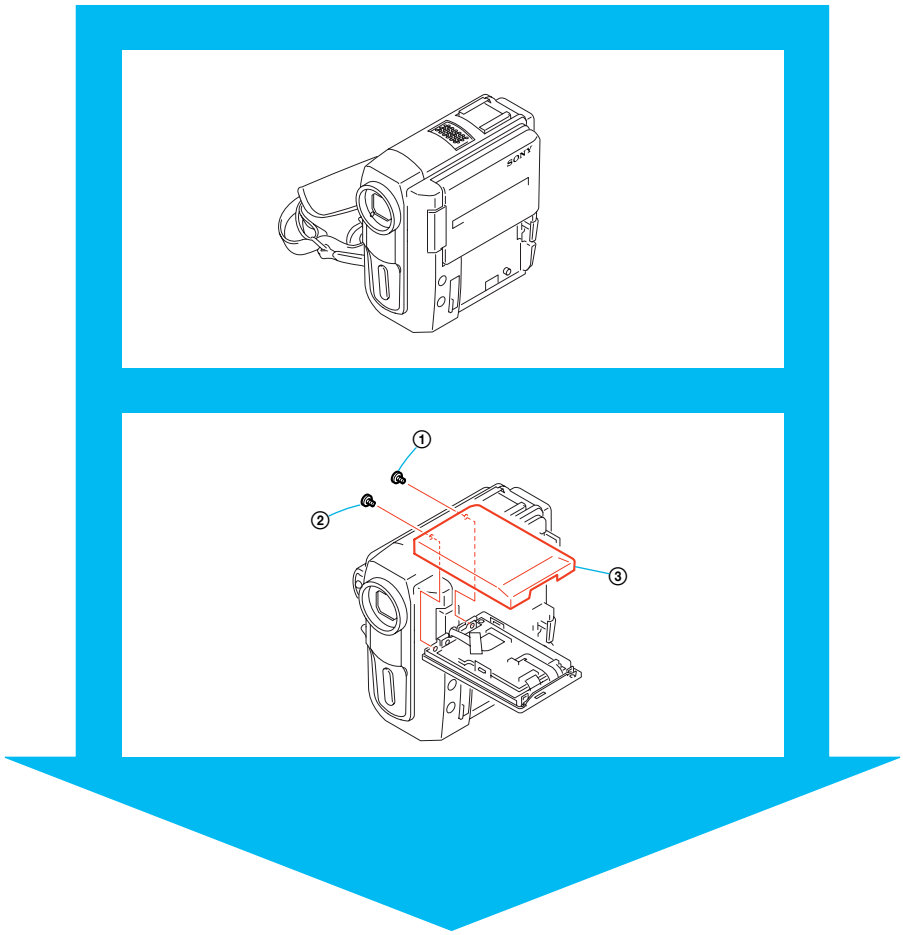
Setting the "Forced VTR Power ON" mode
1) Select page: 0, address: 01, and set data: 01.
2) Select page: 0, address: 10, and set data: 00.
3) Select page: D, address: 10, set data: 02, and press the PAUSE button of the adjustment remote commander.

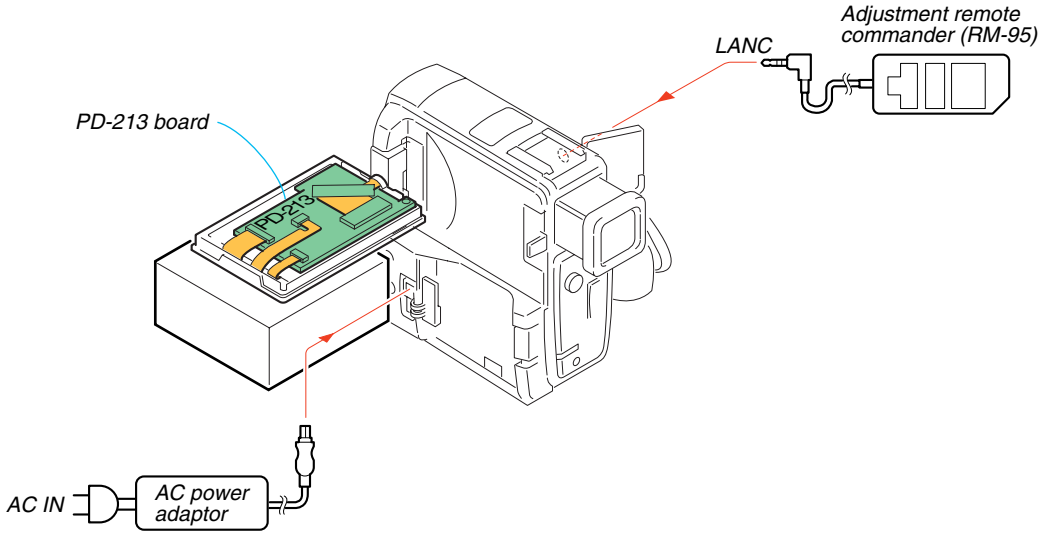
Exiting the "Forced VTR Power ON" mode
1) Select page: 0, address: 01, and set data: 01.
2) Select page: 0, address: 10, and set data: 00.
3) Select page: D, address: 10, set data: 00, and press the PAUSE button of the adjustment remote commander.
4) Select page: 0, address: 01, and set data: 00.



2. DISASSEMBLY

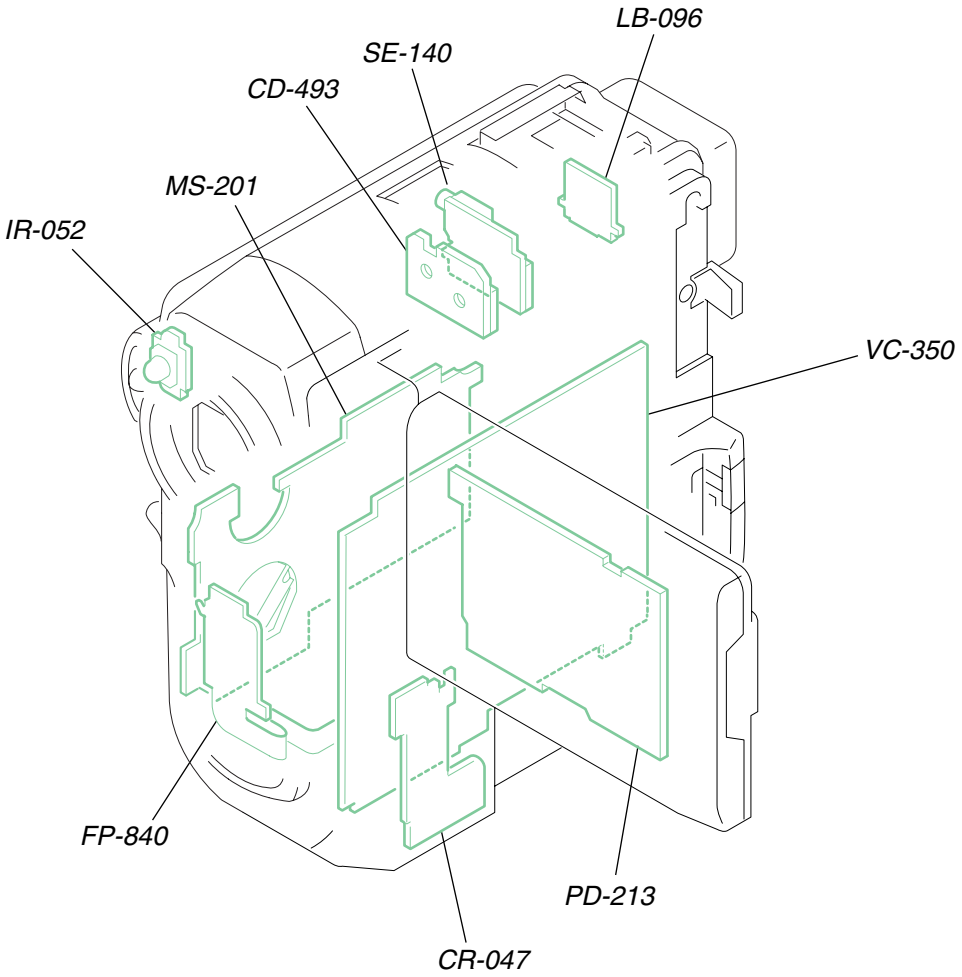
[PD-213 BOARD SERVICE POSITION]





2. DISASSEMBLY

2-3. CIRCUIT BOARDS LOCATION

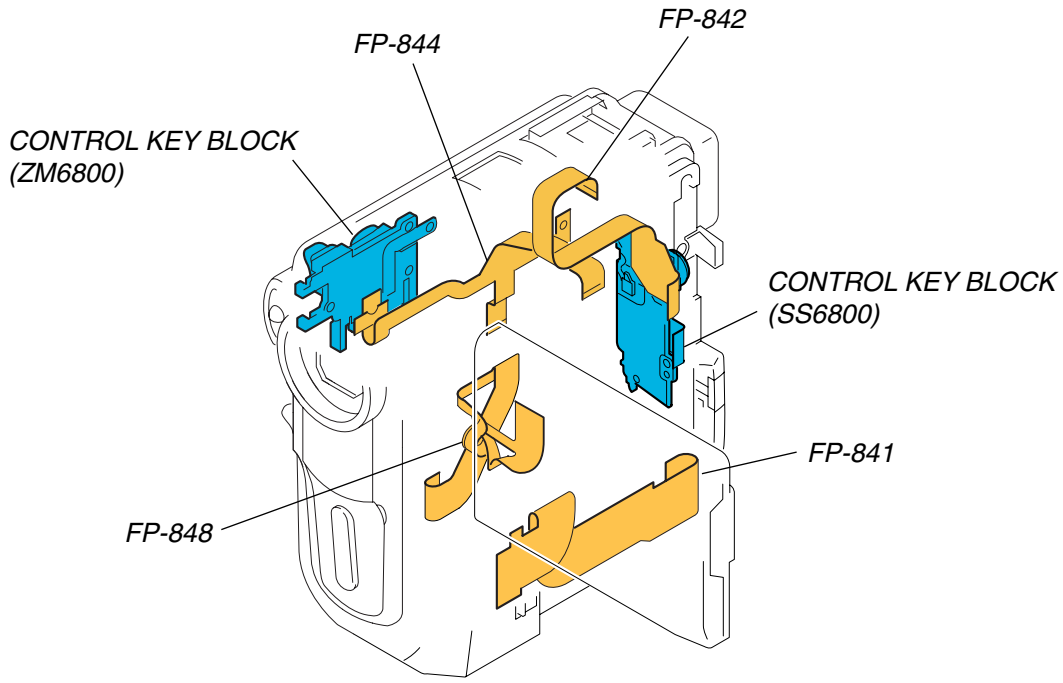


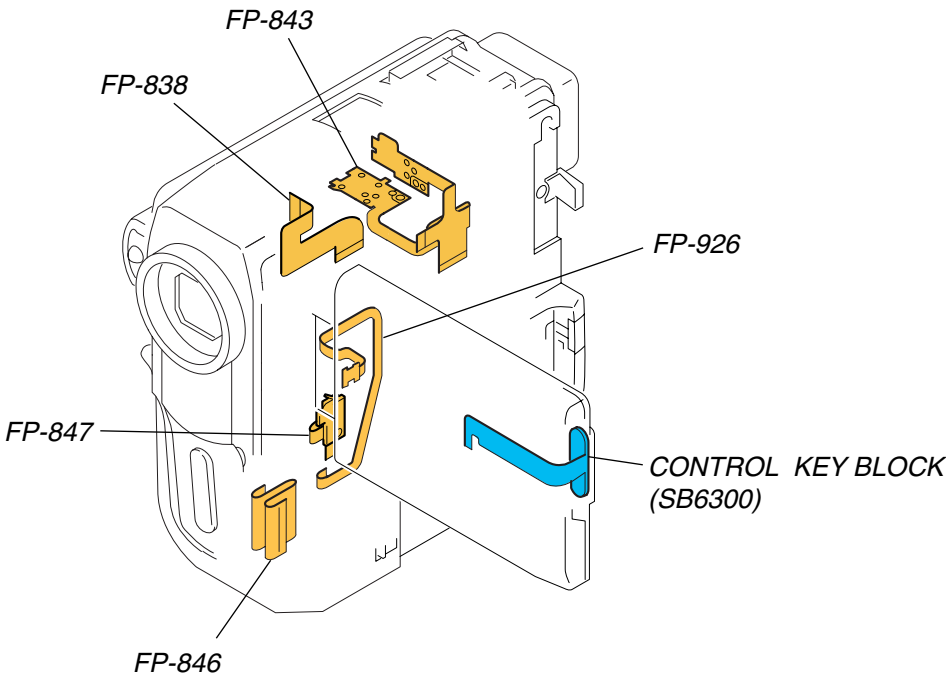
NAME	FUNCTION
CD-493	CCD IMAGER
CR-047	CRADLE CONNECTOR
FP-840	SIRCS, FRONT INDICATOR
IR-052	NIGHT SHOT
LB-096	EVF RELAY
MS-201	MS CONNECTOR
PD-213	LCD RGB DRIVE, BACKLIGHT
SE-140	PITCH/YAW SENSOR AMP, MIC IN
VC-350	TIMING GENERATOR, S/H, AGC, ADC., LENS DRIVE, CAMERA/DV SIGNAL/AUDIO PROCESSOR, DV INTERFACE, VIDEO OUT, REC/PB AMP, DRUM/CAPSTAN/LOADING MOTOR DRIVE, CAMERA/MECHA CONTROL, HI CONTROL, RGB DRIVE, D/A-A/D CONV., MIC AMP, AUDIO OUT, POWER IN, CHARGE, DC/DC CONVERTER, CONNECTOR-1, CONNECTOR-2

2. DISASSEMBLY

2-4. FLEXIBLE BOARDS LOCATION

The flexible boards contained in the lens block is not shown.

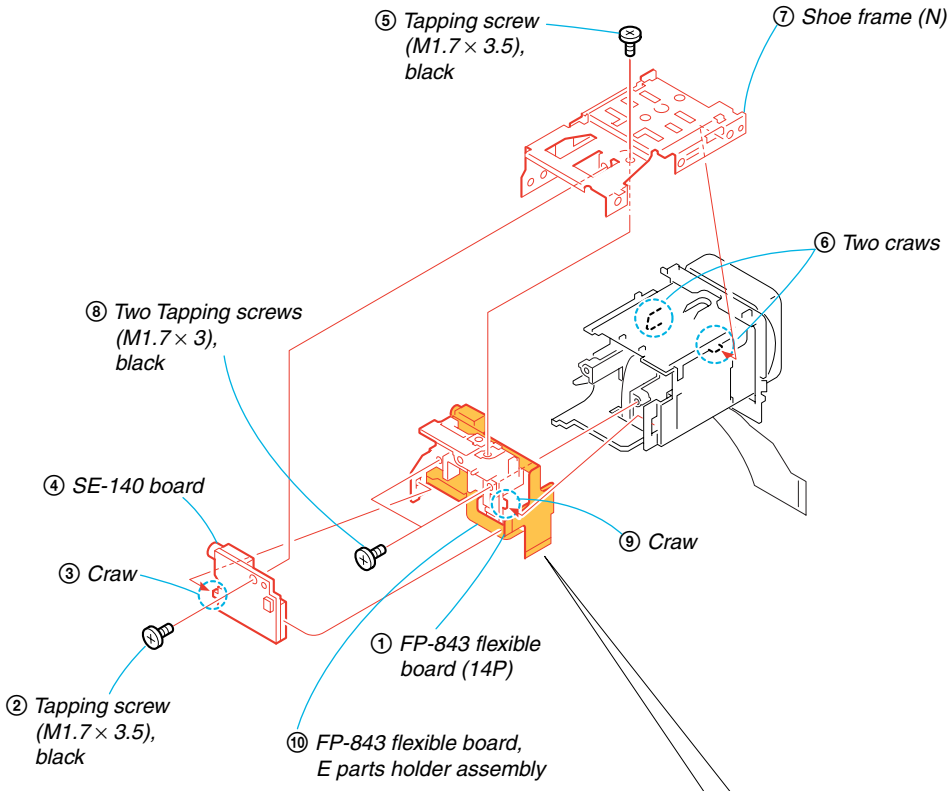




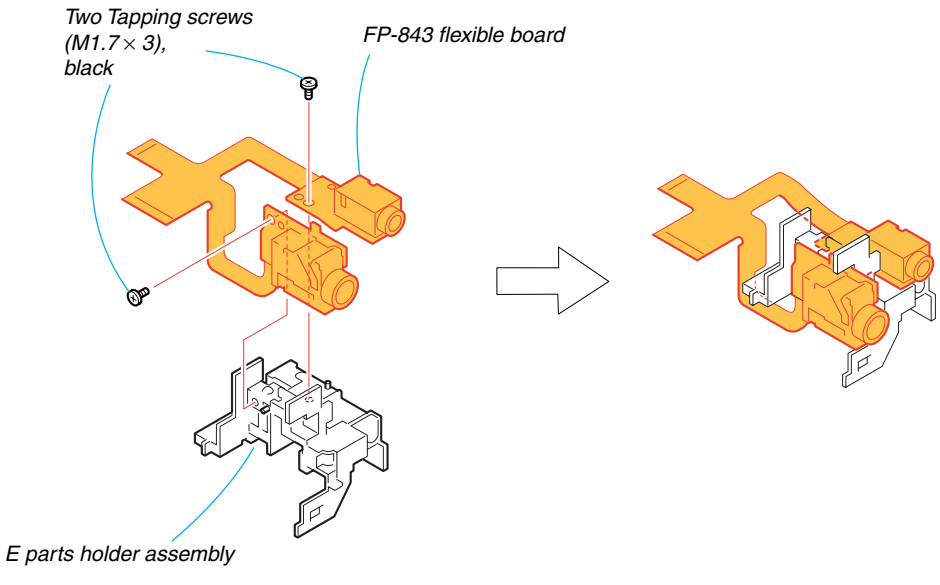
HELP

Sheet attachment positions and procedures of processing the flexible boards/harnesses are shown.

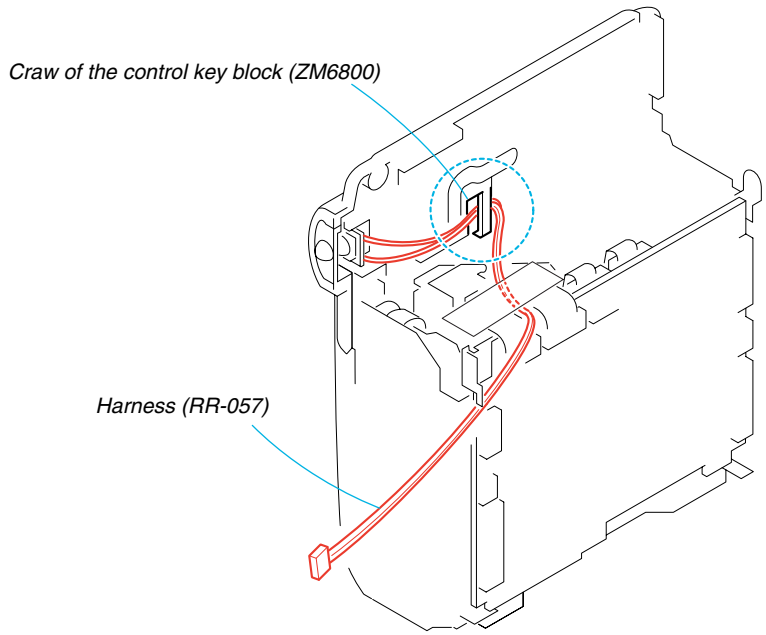
HELP 01


⑤ Tapping screw (M1.7 × 3.5), black
⑦ Shoe frame (N)
⑥ Two craws
⑧ Two Tapping screws (M1.7 × 3), black
④ SE-140 board
⑨ Craw
③ Craw
① FP-843 flexible board (14P)
② Tapping screw (M1.7 × 3.5), black
⑩ FP-843 flexible board, E parts holder assembly

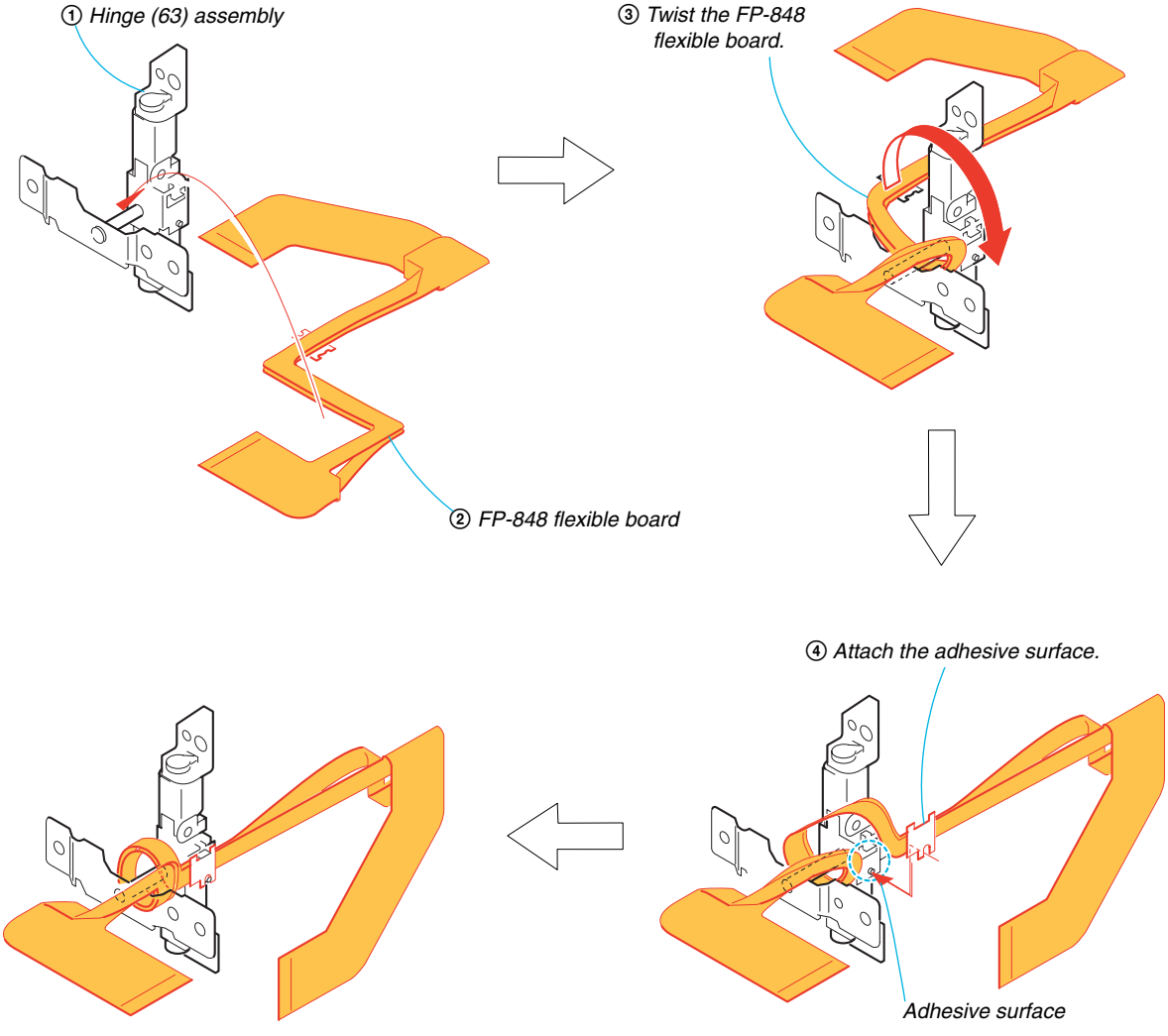
ASSEMBLING THE FP-843 FLEXIBLE BOARD



HELP 02



HELP 03


① Hinge (63) assembly
② FP-848 flexible board
③ Twist the FP-848 flexible board.
④ Attach the adhesive surface.
Adhesive surface

3. BLOCK DIAGRAMS

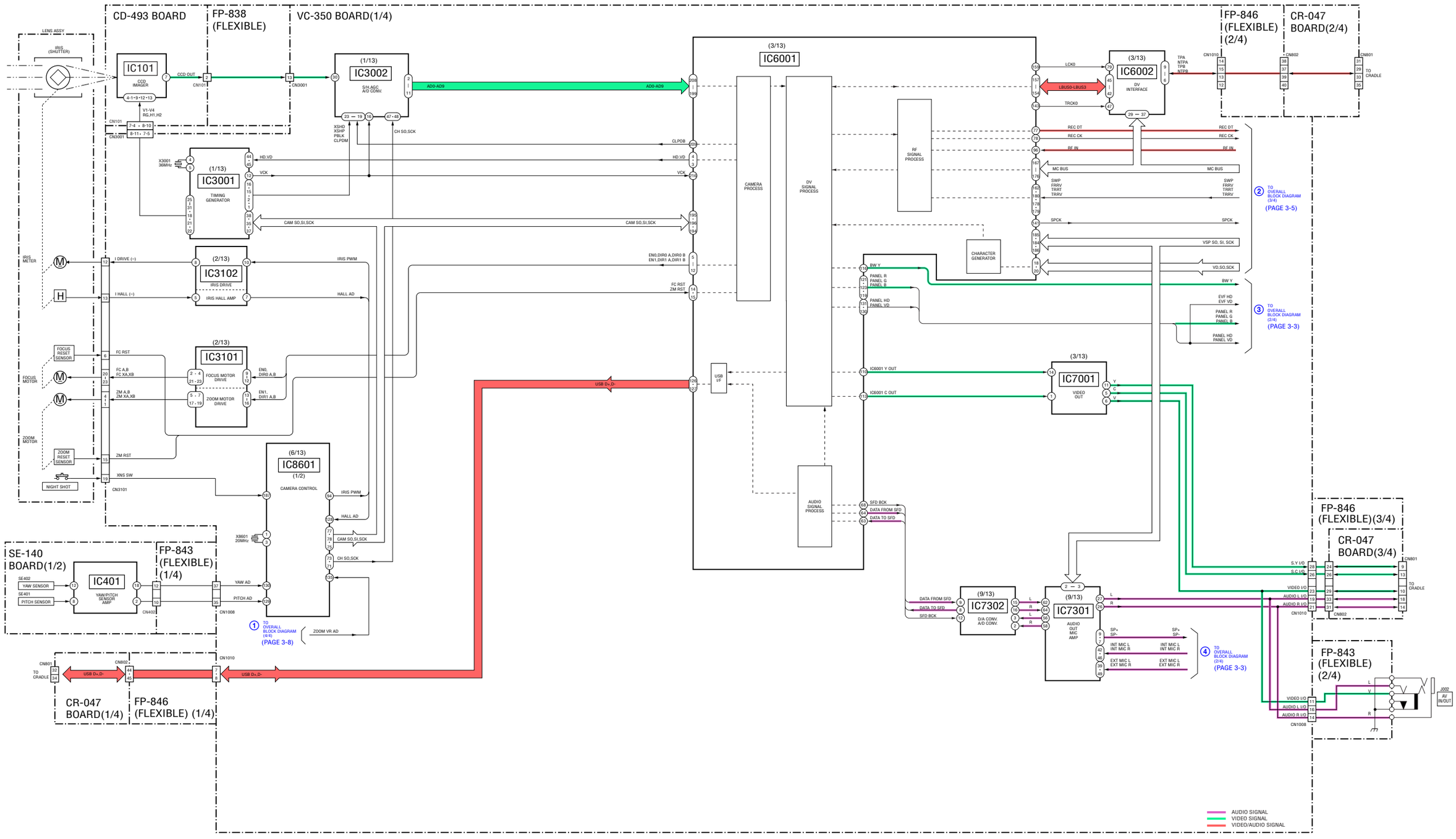
Link

OVERALL BLOCK DIAGRAM (1/4)	POWER BLOCK DIAGRAM (1/2)
OVERALL BLOCK DIAGRAM (2/4)	POWER BLOCK DIAGRAM (2/2)
OVERALL BLOCK DIAGRAM (3/4)	
OVERALL BLOCK DIAGRAM (4/4)	

SECTION 3
BLOCK DIAGRAMS

3-1. OVERALL BLOCK DIAGRAM (1/4)

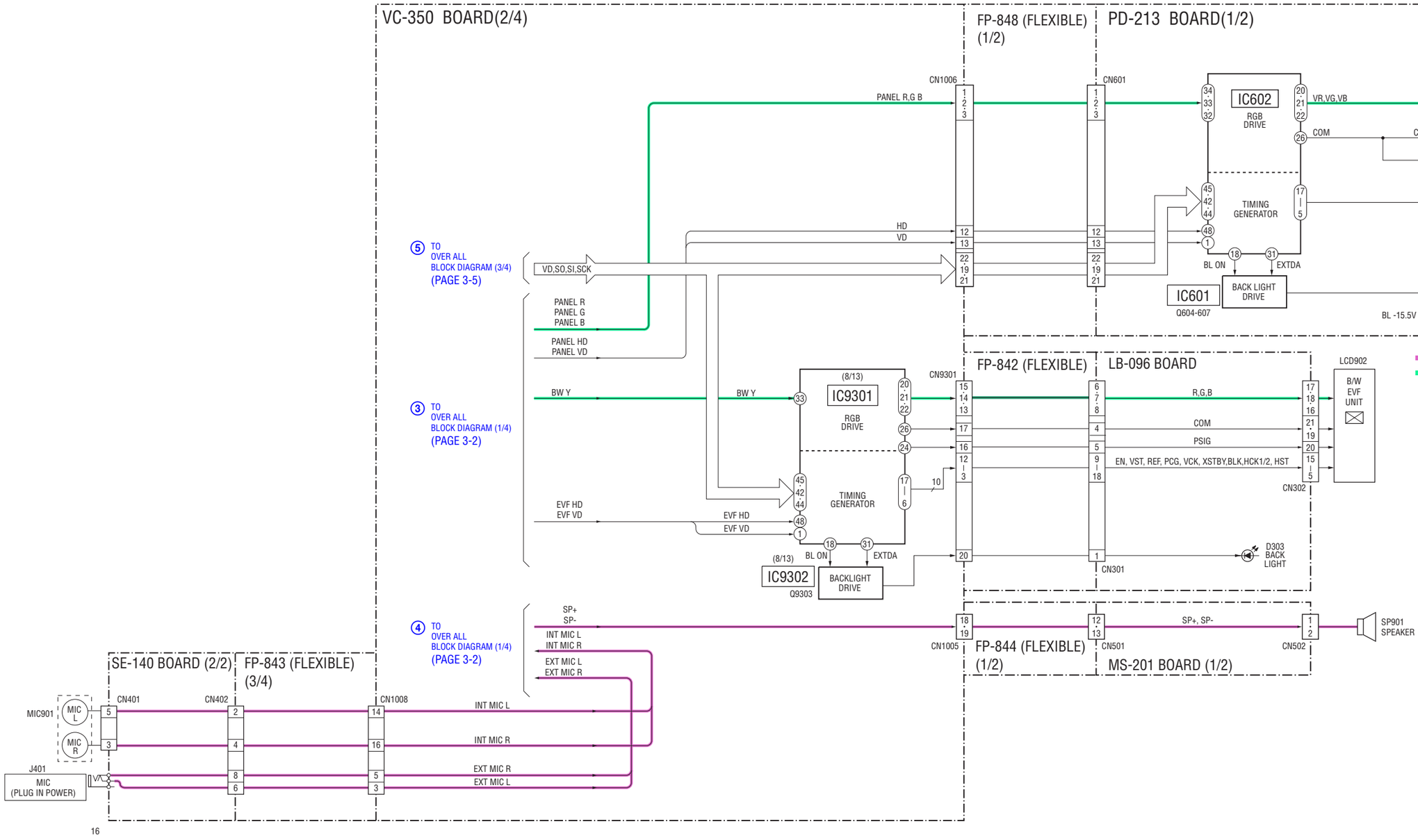
( ) : Number in parenthesis ( ) indicates the division number of schematic diagram where the component is located.



3. BLOCK DIAGRAMS

3-2. OVERALL BLOCK DIAGRAM (2/4)

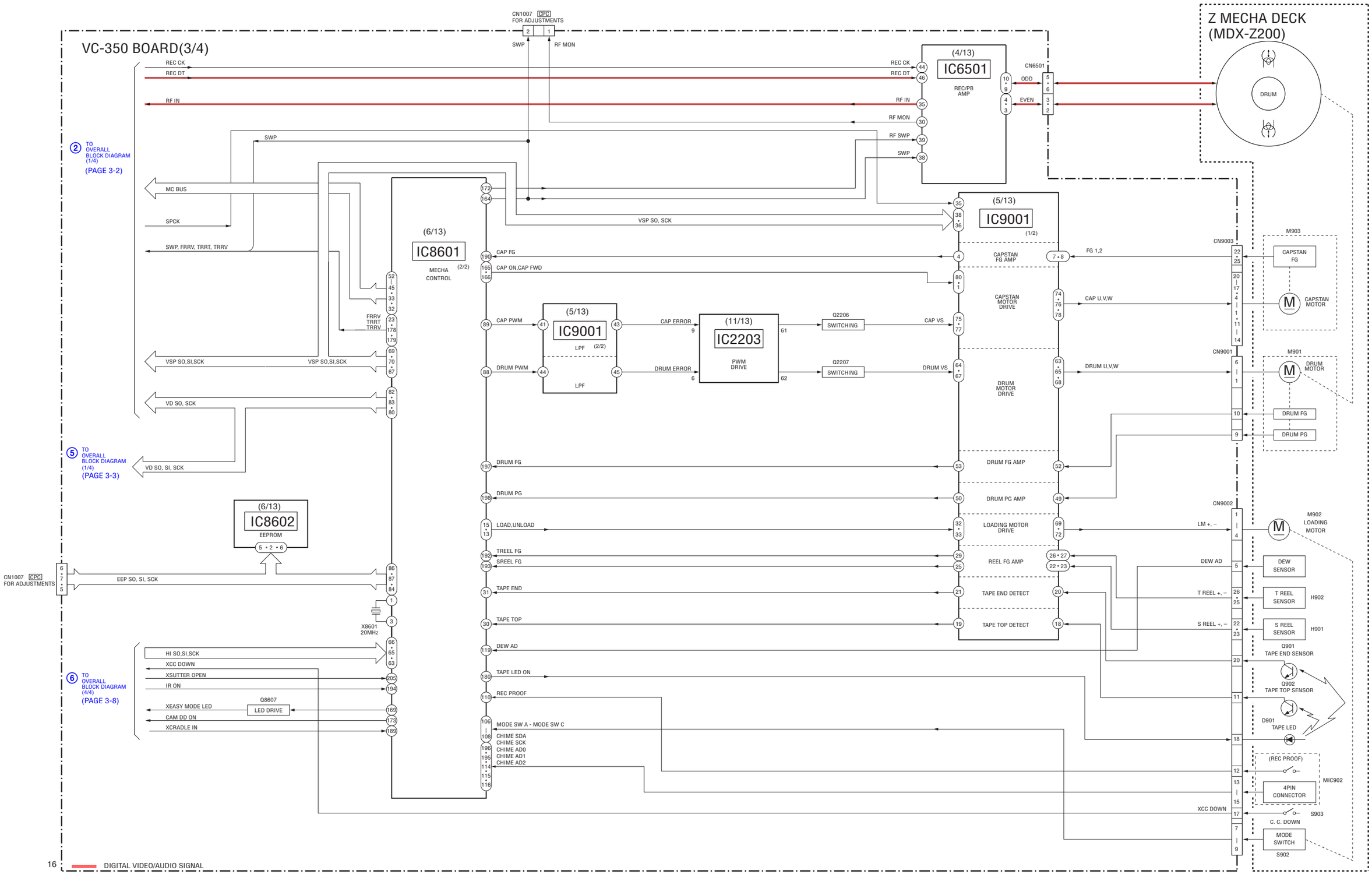
( ) : Number in parenthesis ( ) indicates the division number of schematic diagram where the component is located.



3. BLOCK DIAGRAMS

3-3. OVERALL BLOCK DIAGRAM (3/4)

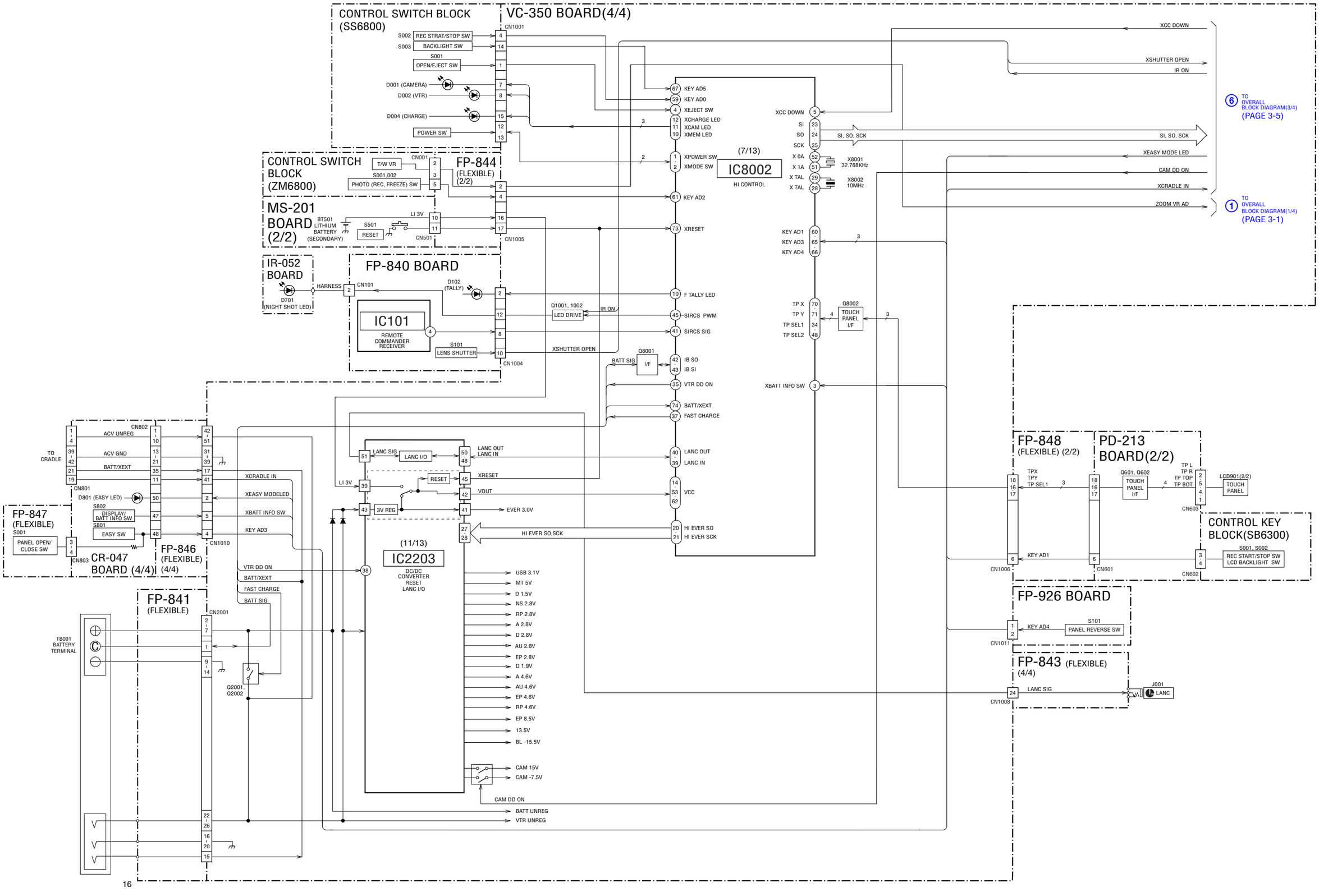
( ) : Number in parenthesis ( ) indicates the division number of schematic diagram where the component is located.



3. BLOCK DIAGRAMS

3-4. OVERALL BLOCK DIAGRAM (4/4)

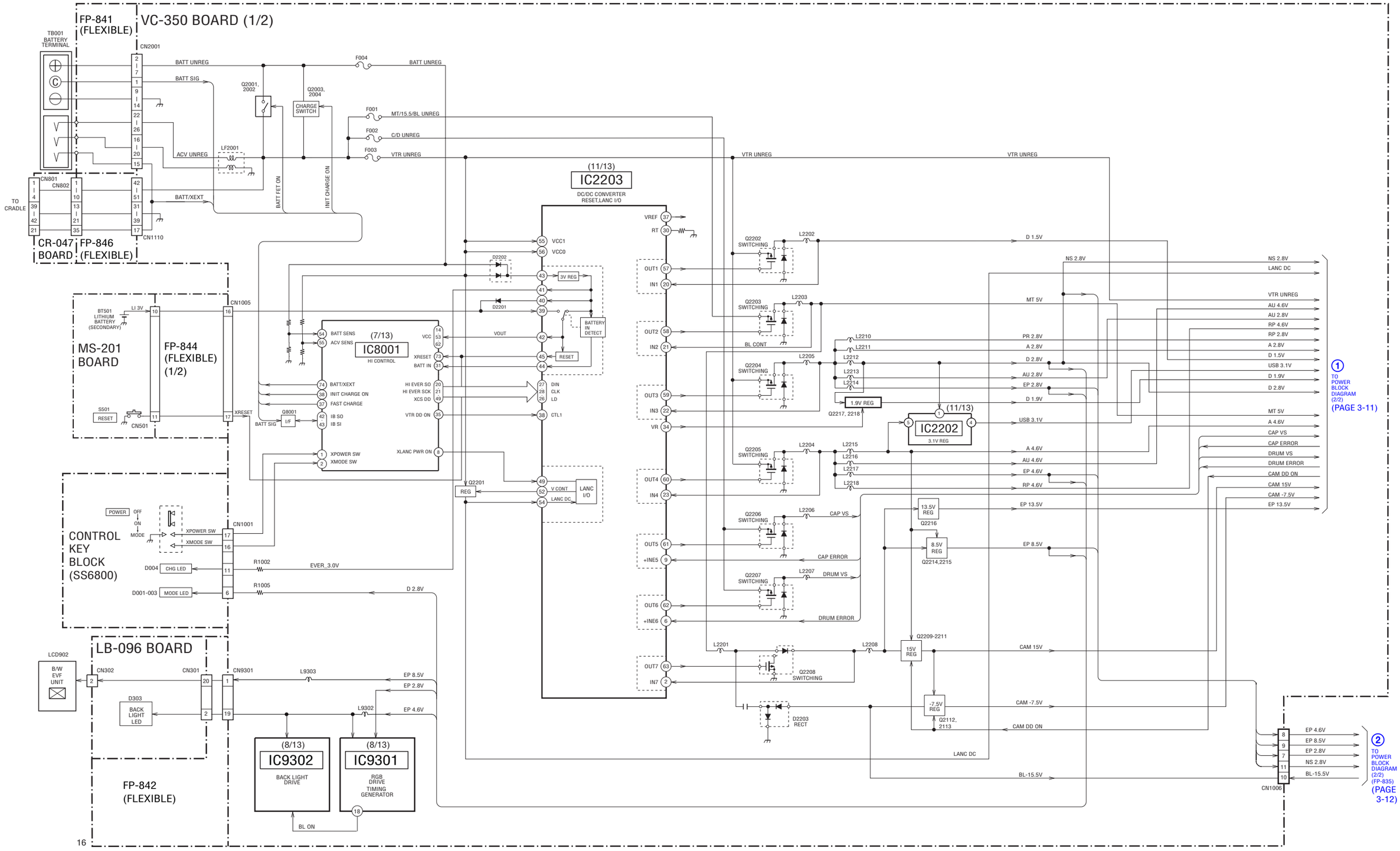
( ) : Number in parenthesis ( ) indicates the division number of schematic diagram where the component is located.



3. BLOCK DIAGRAMS

3-5. POWER BLOCK DIAGRAM (1/2)

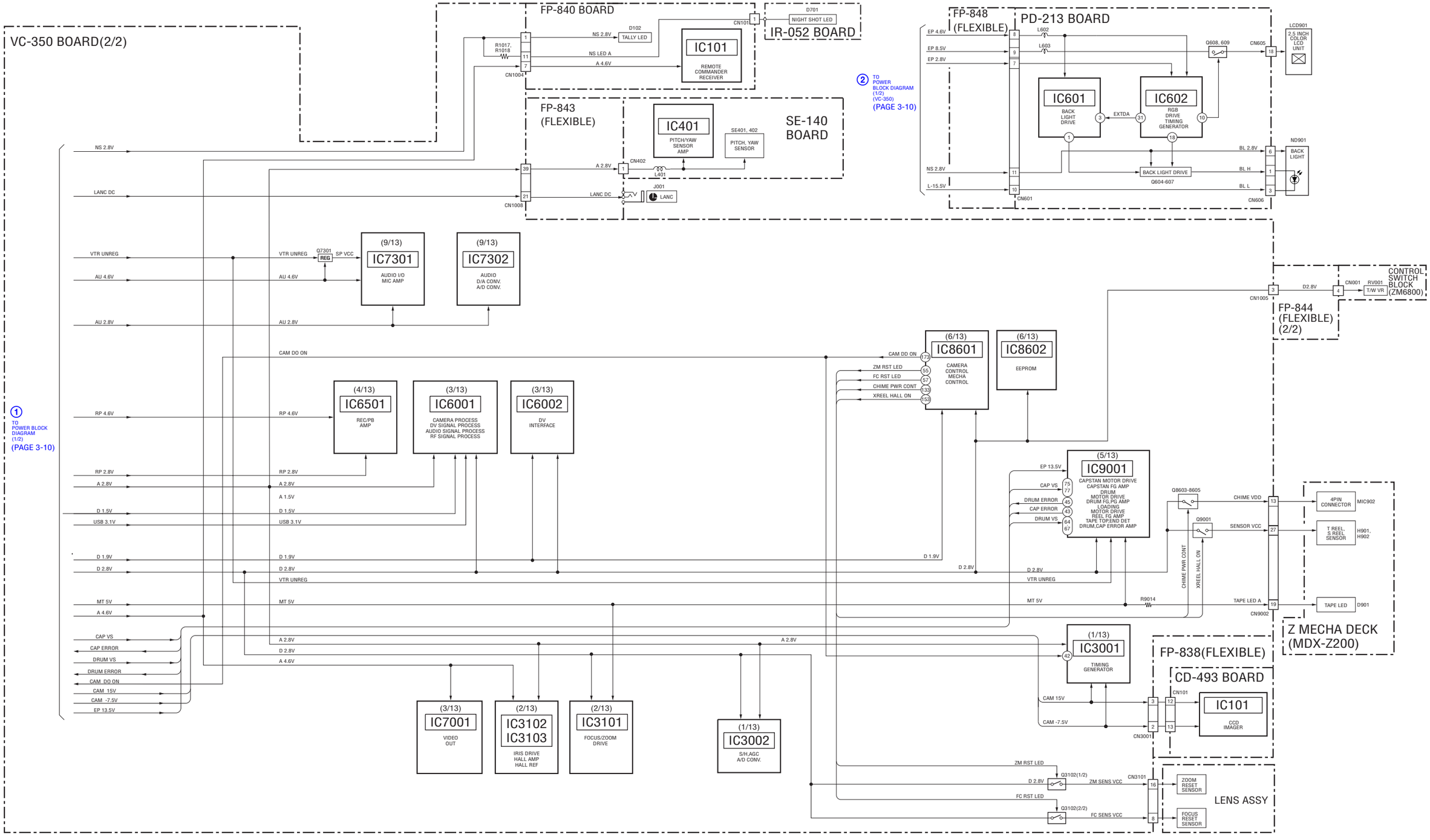
( ) : Number in parenthesis ( ) indicates the division number of schematic diagram where the component is located.



3. BLOCK DIAGRAMS

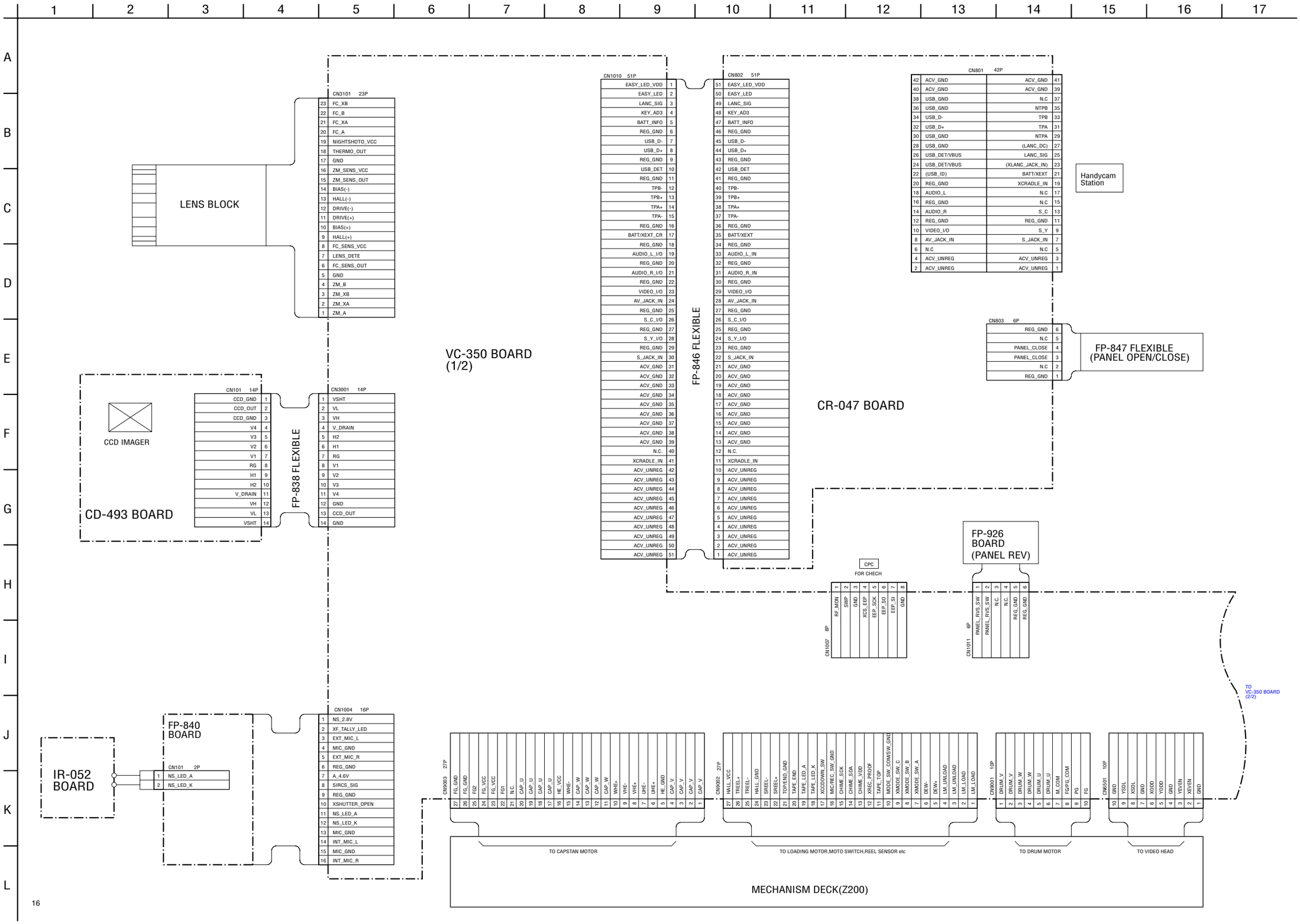
3-6. POWER BLOCK DIAGRAM (2/2)

( ) : Number in parenthesis ( ) indicates the division number of schematic diagram where the component is located.



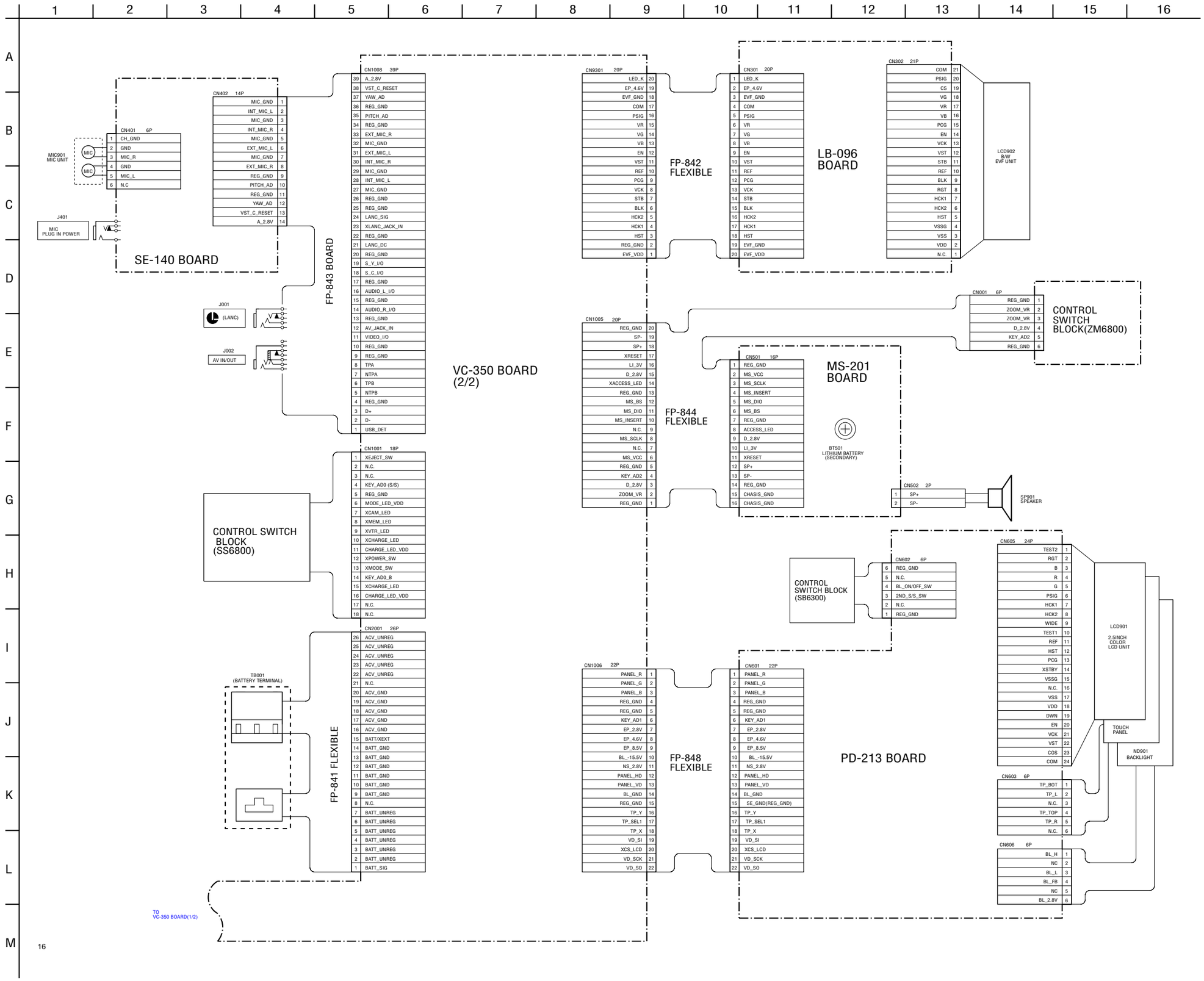
SECTION 4
PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

4-1. FRAME SCHEMATIC DIAGRAM (1/2)



FRAME SCHEMATIC DIAGRAM (1/2)

FRAME SCHEMATIC DIAGRAM (2/2)



FRAME SCHEMATIC DIAGRAM (2/2)

4-2. SCHEMATIC DIAGRAMS

Link

- CD-493 BOARD (CCD IMAGER)
- IR-052 BOARD (NIGHT SHOT)
- PD-213 BOARD (LCD RGB DRIVE, BACKLIGHT)
- MS-201 BOARD (MS CONNECTOR)
- CONTROL KEY BLOCK (SB6300)
- CONTROL SWITCH BLOCK (SS6800)
- LB-096 BOARD (EVF RELAY)
- CONTROL SWITCH BLOCK (ZM6800)
- SE-140 BOARD (PITCH/YAW SENSOR AMP, MIC IN)
- FP-926 BOARD (PANEL REVERSE)
- CR-047 BOARD (CLADLE CONNECTOR)
- FP-841 FLEXIBLE BOARD (BAT DC/IN)
- FP-847 FLEXIBLE BOARD
- FP-843 FLEXIBLE BOARD (JACK)
- FP-840 BOARD (SIRCS, FRONT INDICATOR)
- FP-228/FP-467/FP-826 FLEXIBLE BOARD

- COMMON NOTE FOR SCHEMATIC DIAGRAMS

4-2. SCHEMATIC DIAGRAMS

THIS NOTE IS COMMON FOR SCHEMATIC DIAGRAMS
(In addition to this, the necessary note is printed in each block)

(For schematic diagrams)

- All capacitors are in μF unless otherwise noted. pF : μμF. 50 V or less are not indicated except for electrolytics and tantalums.
- Chip resistors are 1/10 W unless otherwise noted. kΩ=1000 Ω, MΩ=1000 kΩ.
- Caution when replacing chip parts. New parts must be attached after removal of chip. Be careful not to heat the minus side of tantalum capacitor, Because it is damaged by the heat.
- Some chip part will be indicated as follows.

Example C541 22U TA A L452 10UH 2520

Kinds of capacitor
Temperature characteristics
External dimensions (mm)

- Constants of resistors, capacitors, ICs and etc with XX indicate that they are not used. In such cases, the unused circuits may be indicated.
- Parts with * differ according to the model/destination. Refer to the mount table for each function.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- Signal name
  XEDIT → $\overline{\text{EDIT}}$ PB/XREC → PB/$\overline{\text{REC}}$
- : non flammable resistor
- : fusible resistor
- : panel designation
- : B+ Line
- : B– Line
- : IN/OUT direction of (+,–) B LINE.
- : adjustment for repair.
- : VIDEO SIGNAL (ANALOG)
- : AUDIO SIGNAL (ANALOG)
- : VIDEO/AUDIO SIGNAL (ANALOG)
- : VIDEO/AUDIO/SERVO SIGNAL
- : SERVO SIGNAL
- Circled numbers refer to waveforms.

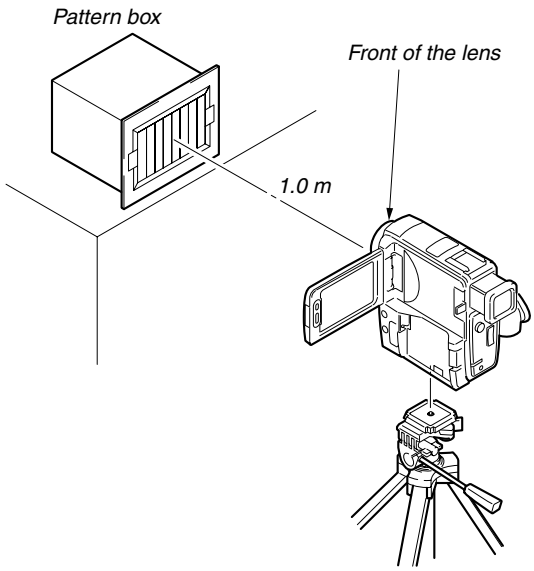
(Measuring conditions voltage and waveform)

- Voltages and waveforms are measured between the measurement points and ground when camera shoots color bar chart of pattern box. They are reference values and reference waveforms. (VOM of DC 10 MΩ input impedance is used)
- Voltage values change depending upon input impedance of VOM used.)

Precautions Upon Replacing CCD imager

- The CD-493 board mounted as a repair part is not equipped with a CCD imager. When replacing this board, remove the CCD imager from the old one and mount it onto the new one.
- If the CCD imager has been replaced, carry out all the adjustments for the camera section.
- As the CCD imager may be damaged by static electricity from its structure, handle it carefully like for the MOS IC. In addition, ensure that the receiver is not covered with dusts nor exposed to strong light.

1. Connection



2. Adjust the distance so that the output waveform of Fig. a and the Fig. b can be obtain.

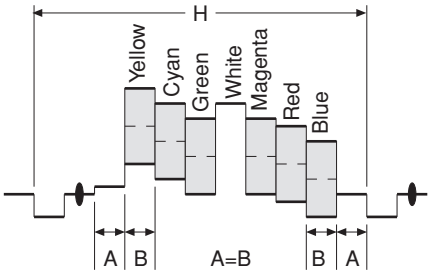


Fig. a (Video output terminal output waveform)

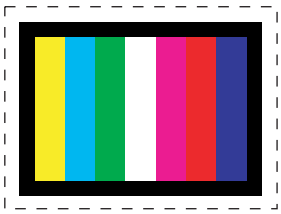


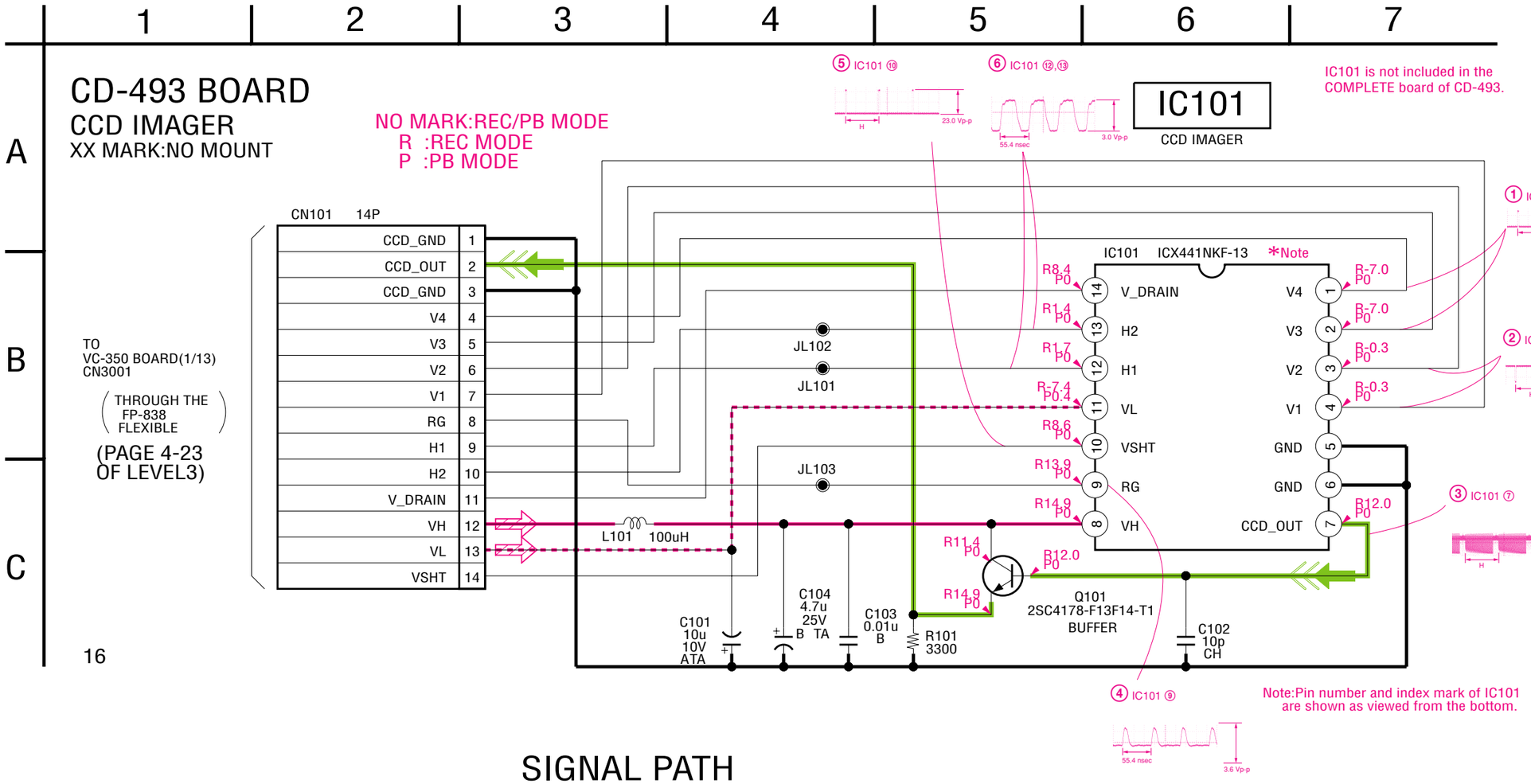
Fig.b (Picture on monitor TV)

When indicating parts by reference number, please include the board name.

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

4-2. SCHEMATIC DIAGRAMS

For Schematic Diagram
• Refer to page 4-53 for printed wiring board.



SIGNAL PATH

	VIDEO SIGNAL		
	CHROMA	Y	Y/CHROMA
REC			➡
PB			

4-2. SCHEMATIC DIAGRAMS | PD-213 PRINTED WIRING BOARD

For Schematic Diagram

• Refer to page 4-57 for printed wiring board.

PD-213 BOARD
LCD RGB DRIVE,BACKLIGHT
XX MARK:NO MOUNT
NO MARK:REC/PB MODE

SIGNAL PATH

	VIDEO SIGNAL		
	CHROMA	Y	Y/CHROMA
REC	▶		
PB	▷		

TO VC-350 BOARD(13/13) CN1006 (THROUGH THE FP-848 FLEXIBLE)
(PAGE 4-47 OF LEVEL3)

CN601 22P: PANEL_R 1, PANEL_G 2, PANEL_B 3, REG_GND 4, REG_GND 5, KEY_AD1 6, EP_2.8V 7, EP_4.6V 8, EP_8.5V 9, BL_-15.5V 10, NS_2.8V 11, PANEL_HD 12, PANEL_VD 13, BL_GND 14, SE_GND(REG_GND) 15, TP_Y 16, TP_SEL1 17, TP_X 18, VD_SI 19, XCS_LCD 20, VD_SCK 21, VD_SO 22

IC602 LCD RGB DRIVE
IC602 CXM3006R-T4

CN605 24P: 24 COM, 23 CS, 22 VST, 21 VCK, 20 EN, 19 DWN, 18 VDD, 17 VSS, 16 N.C., 15 VSSG, 14 XSTBY, 13 PCG, 12 HST, 11 REF, 10 TEST1, 9 WIDE, 8 HCK2, 7 HCK1, 6 PSIG, 5 G, 4 R, 3 B, 2 RGT, 1 TEST2

LCD901 2.5INCH COLOR LCD UNIT (With in Touch Panel)

CONTROL KEY BLOCK (SB6300)
S001 REC START/STOP
S002 LCD BACKLIGHT

6P		CN602 6P	
1	REG_GND	REG_GND	1
2	N.C.	N.C.	2
3	2ND_S/S_SW	2ND_S/S_SW	3
4	BL_ON/OFF_SW	BL_ON/OFF_SW	4
5	N.C.	N.C.	5
6	REG_GND	REG_GND	6

TOUCH PANEL (Included LCD901)

CN603 6P: TP_BOT 1, TP_L 2, N.C. 3, TP_TOP 4, TP_R 5, N.C. 6

CN606 6P: 6 BL_2.8V, 5 N.C., 4 BL_FB, 3 BL_L, 2 N.C., 1 BL_H

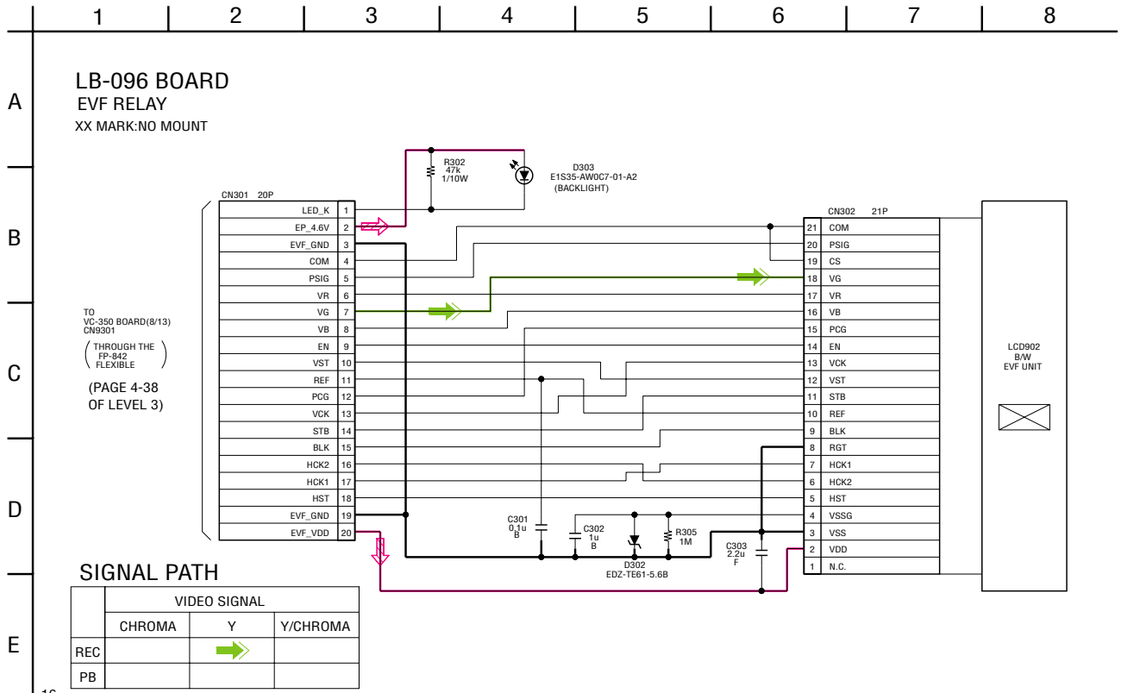
ND901 BACKLIGHT

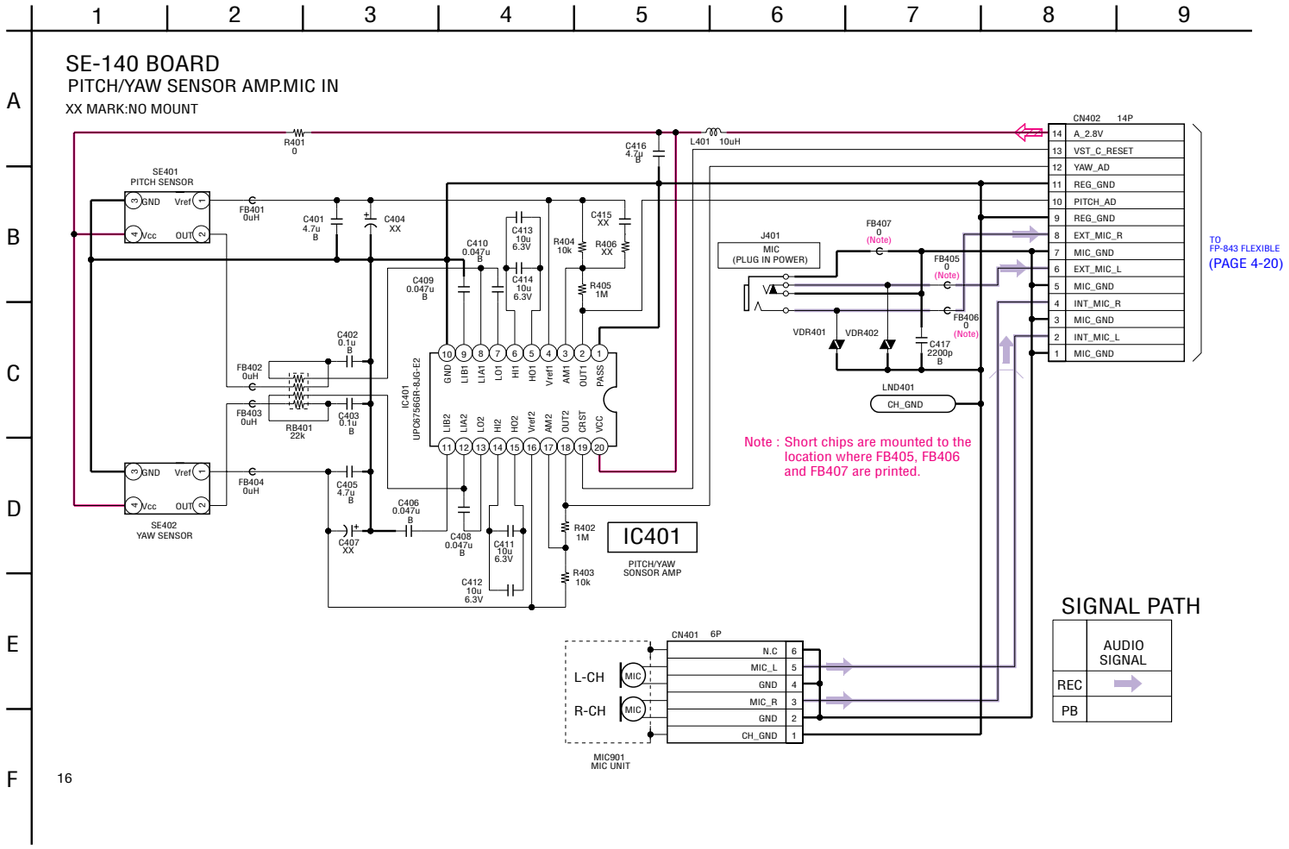
IC601 SELECT SWITCH
IC601 NJM12904V(TE2)

CONTROL KEY BLOCK(SB6300) is replaced as a block.
So that this PRINTED WIRING BOARD is omitted.

For Schematic Diagram

• Refer to page 4-56 for printed wiring board of LB-096.
• Refer to page 4-61 for printed wiring board of SE-140.

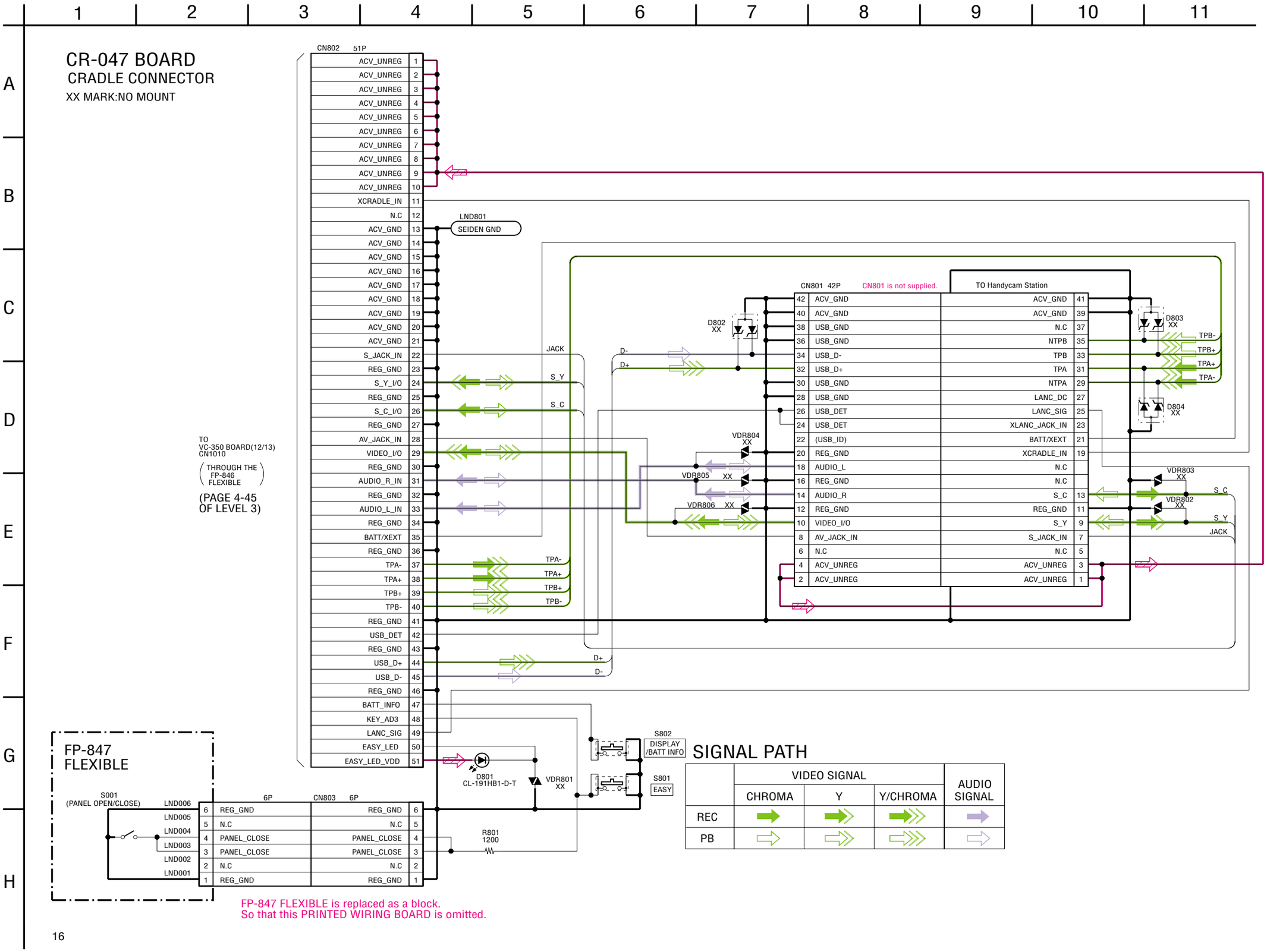




4-2. SCHEMATIC DIAGRAMS | CR-047 PRINTED WIRING BOARD

For Schematic Diagram

• Refer to page 4-55 for printed wiring board.

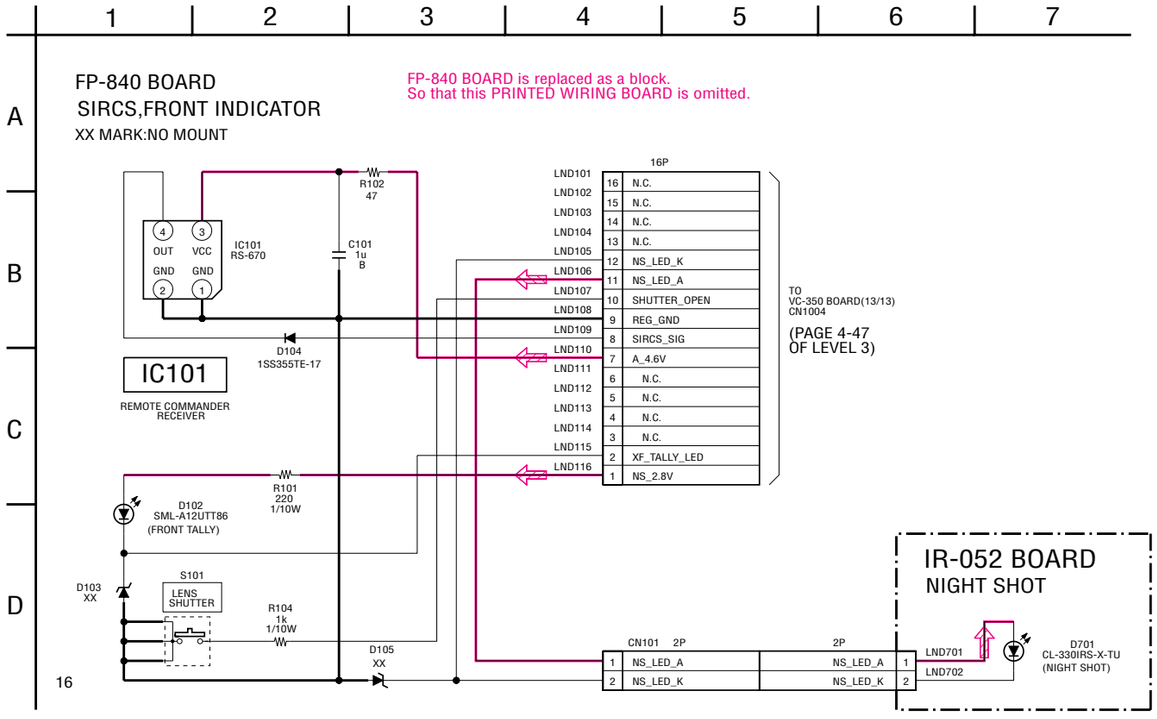


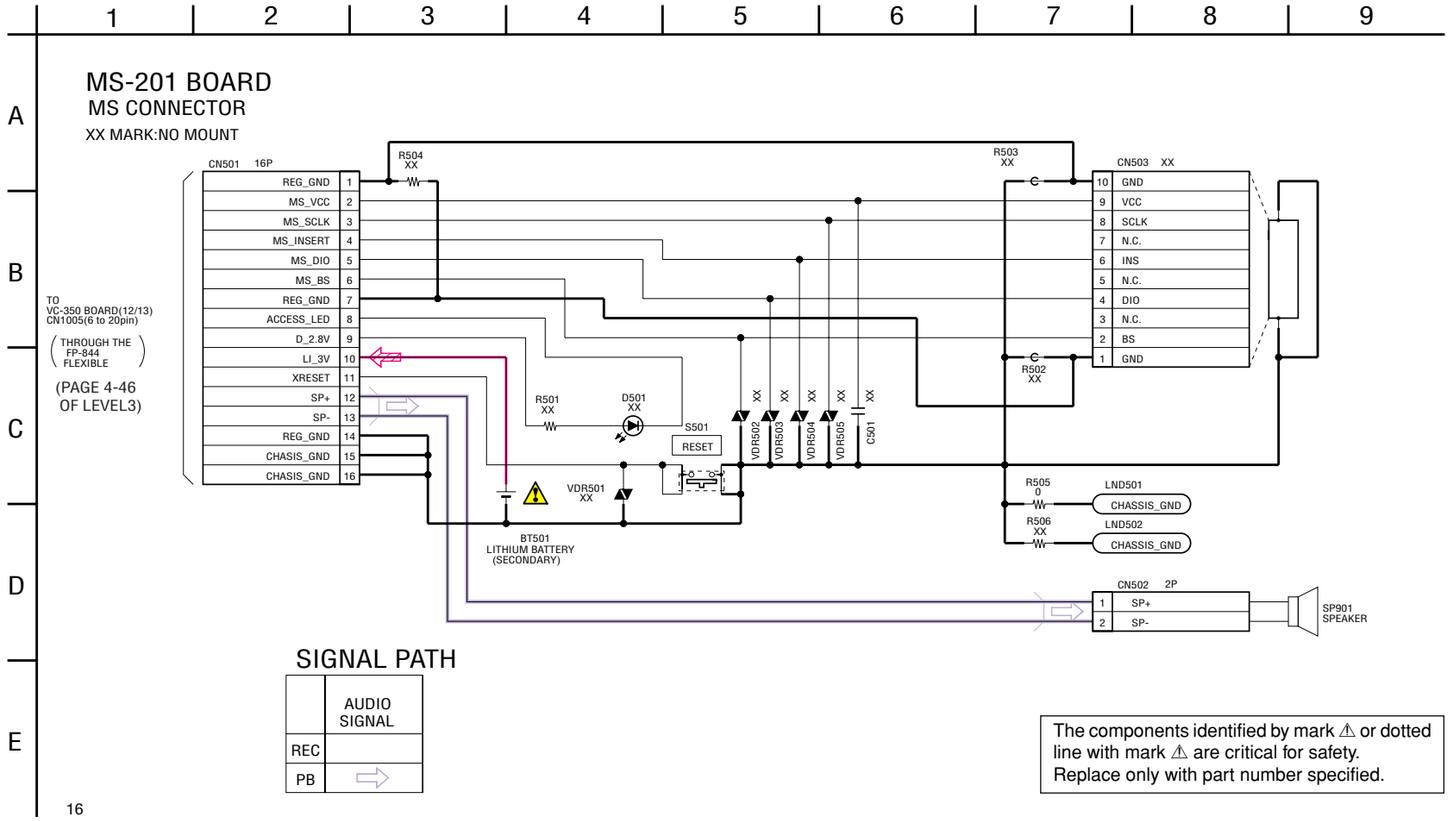
SIGNAL PATH

	VIDEO SIGNAL			AUDIO SIGNAL
	CHROMA	Y	Y/CHROMA	
REC	⇒	⇒	⇒	⇒
PB	⇨	⇨	⇨	⇨

For Schematic Diagram

• Refer to page 4-53 for printed wiring board of IR-052.
• Refer to page 4-59 for printed wiring board of MS-201.





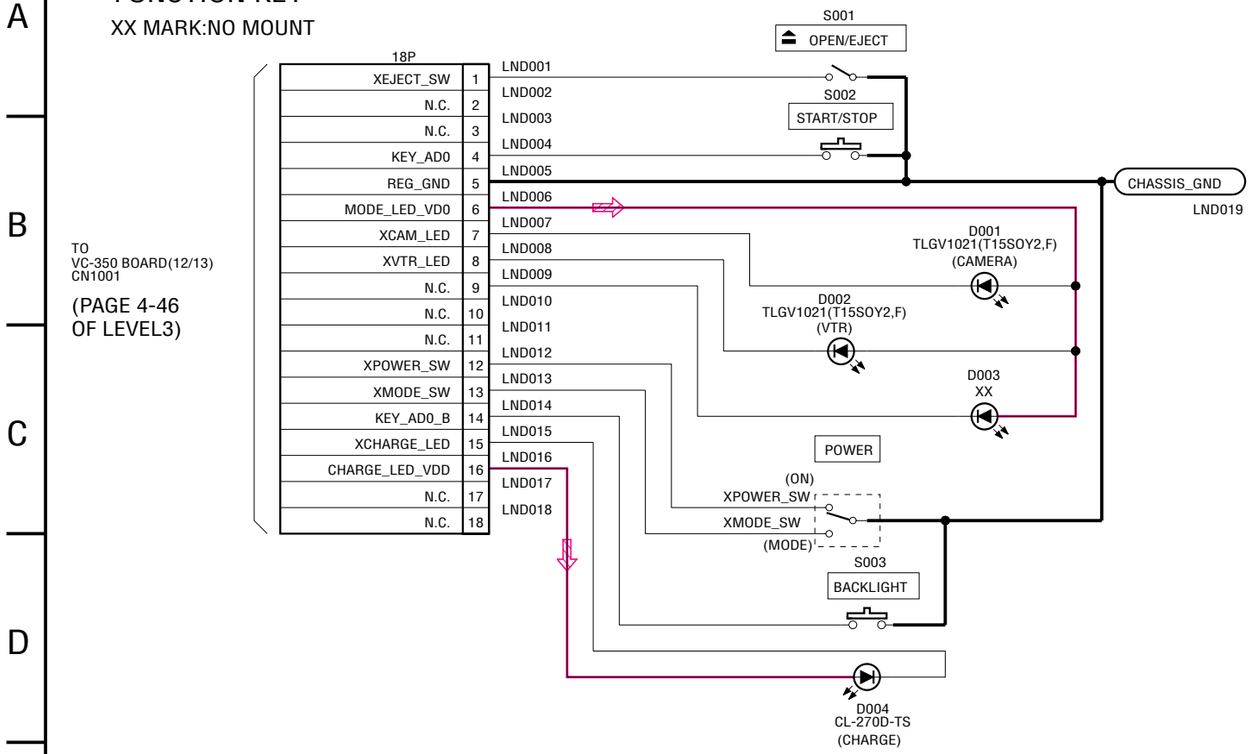
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

CONTROL SWITCH BLOCK(SS6800)

FUNCTION KEY

XX MARK:NO MOUNT

CONTROL SWITCH BLOCK(SS6800) is replaced as a block.
So that this PRINTED WIRING BOARD is omitted.

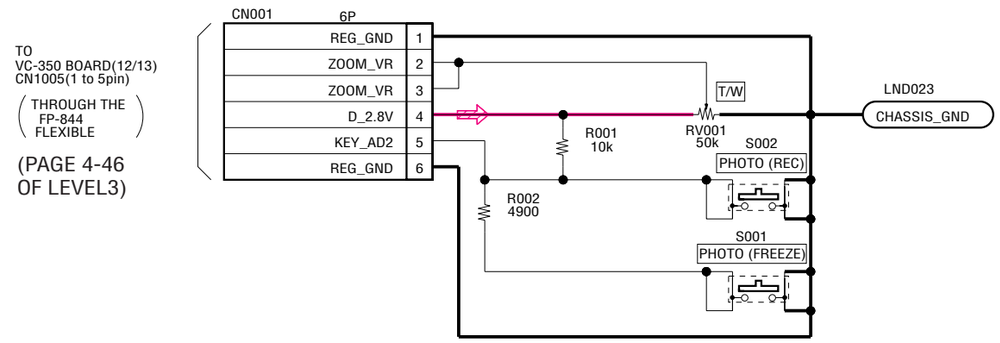


16

CONTROL SWITCH BLOCK(ZM6800)

FUNCTION KEY

XX MARK:NO MOUNT



CONTROL SWITCH BLOCK(ZM6800) is replaced as a block.
So that this PRINTED WIRING BOARD is omitted.

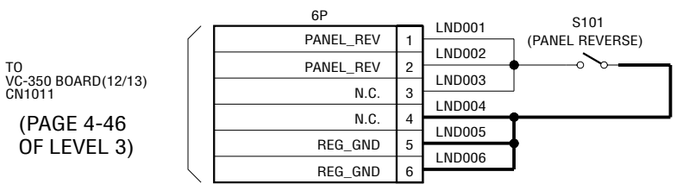
16

FP-926 BOARD

PANEL REVERSE

XX MARK:NO MOUNT

FP-926 BOARD is replaced as a block.
So that this PRINTED WIRING BOARD is omitted.



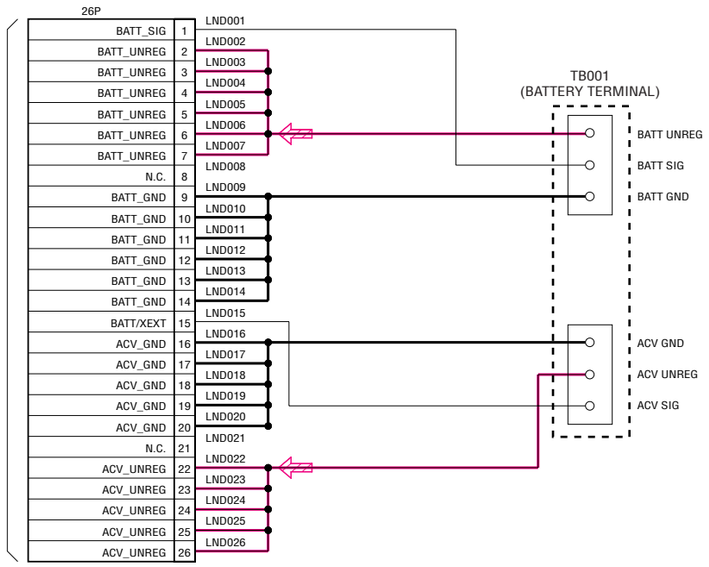
16

FP-841 FLEXIBLE

BAT/DC IN

XX MARK:NO MOUNT

FP-841 FLEXIBLE is replaced as a block.
So that this PRINTED WIRING BOARD is omitted.



TO
VC-350 BOARD(10/13)
CN2001

(PAGE 4-41
OF LEVEL 3)

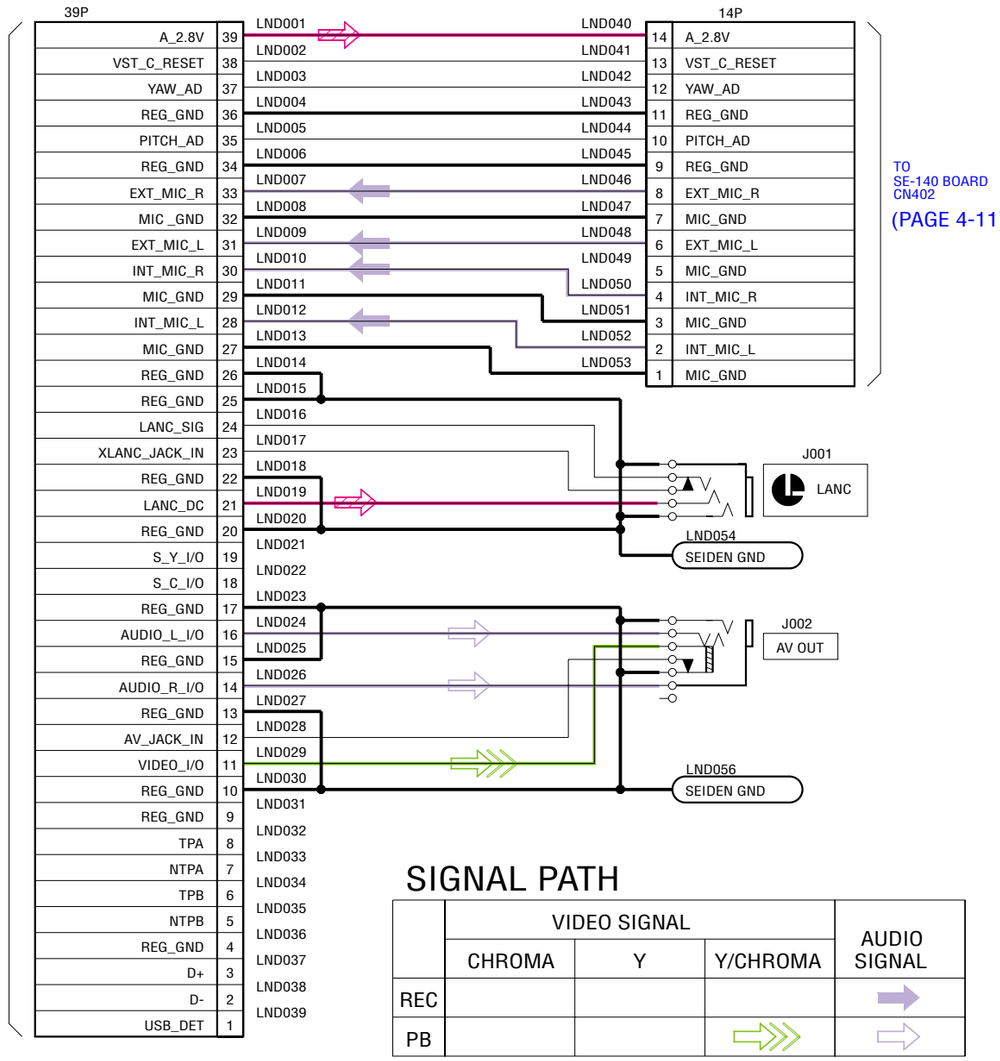
16

FP-843 FLEXIBLE

JACK

XX MARK:NO MOUNT

FP-843 FLEXIBLE is replaced as a block.
So that this PRINTED WIRING BOARD is omitted.



TO
VC-350 BOARD(13/13)
CN1008

(PAGE 4-48
OF LEVEL 3)

TO
SE-140 BOARD
CN402

(PAGE 4-11)

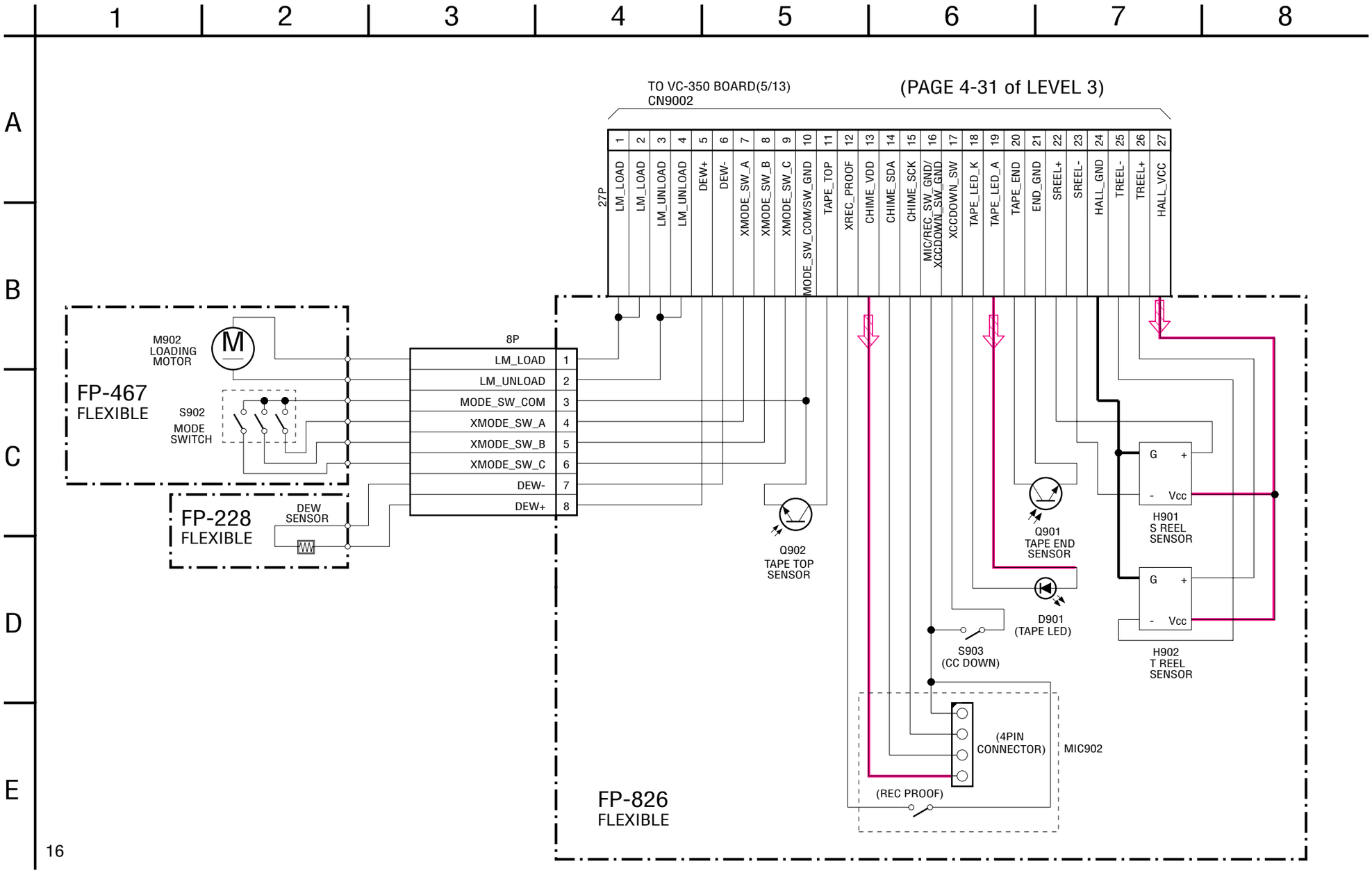
16

SIGNAL PATH

	VIDEO SIGNAL			AUDIO SIGNAL
	CHROMA	Y	Y/CHROMA	
REC				⇨
PB			⇨	⇨

For Schematic Diagram

• Refer to page 4-61 for flexible wiring board.



Schematic diagram of the VC-350 board are not shown.
Pages from 4-23 to 4-48 are not shown.

4-3. PRINTED WIRING BOARDS

Link

- CD-493 BOARD
- SE-140 BOARD
- IR-052 BOARD
- PD-213 BOARD
- CR-047 BOARD
- MS-201 BOARD
- LB-096 BOARD
- FP-228/FP-467/FP-826 FLEXIBLE BOARD
- COMMON NOTE FOR PRINTED WIRING BOARDS
- MOUNTED PARTS LOCATION
- CIRCUIT BOARDS LOCATION
- FLEXIBLE BOARDS LOCATION

NAME	FUNCTION
CD-493	CCD IMAGER
CR-047	CRADLE CONNECTOR
FP-840	SIRCS, FRONT INDICATOR
IR-052	NIGHT SHOT
LB-096	EVF RELAY
MS-201	MS CONNECTOR
PD-213	LCD RGB DRIVE, BACKLIGHT
SE-140	PITCH/YAW SENSOR AMP, MIC IN
VC-350	TIMING GENERATOR, S/H, AGC, ADC., LENS DRIVE, CAMERA/DV SIGNAL/AUDIO PROCESSOR, DV INTERFACE, VIDEO OUT, REC/PB AMP, DRUM/CAPSTAN/LOADING MOTOR DRIVE, CAMERA/MECHA CONTROL, HI CONTROL, RGB DRIVE, D/A-A/D CONV., MIC AMP, AUDIO OUT, POWER IN, CHARGE, DC/DC CONVERTER, CONNECTOR-1, CONNECTOR-2

4-3. PRINTED WIRING BOARDS

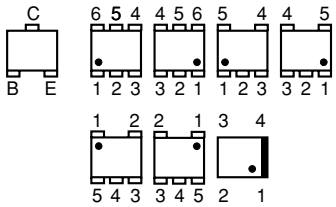
THIS NOTE IS COMMON FOR WIRING BOARDS
(In addition to this, the necessary note is printed in each block)

(For printed wiring boards)

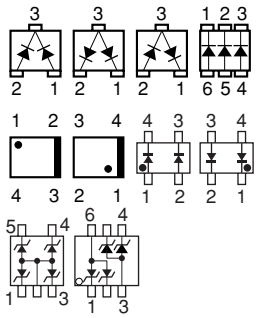
- : Uses unleaded solder.
- : Pattern from the side which enables seeing. (The other layers' patterns are not indicated)
- Through hole is omitted.
- Circled numbers refer to waveforms.
- There are a few cases that the part printed on diagram isn't mounted in this model.
- : panel designation

- Chip parts.

Transistor



Diode



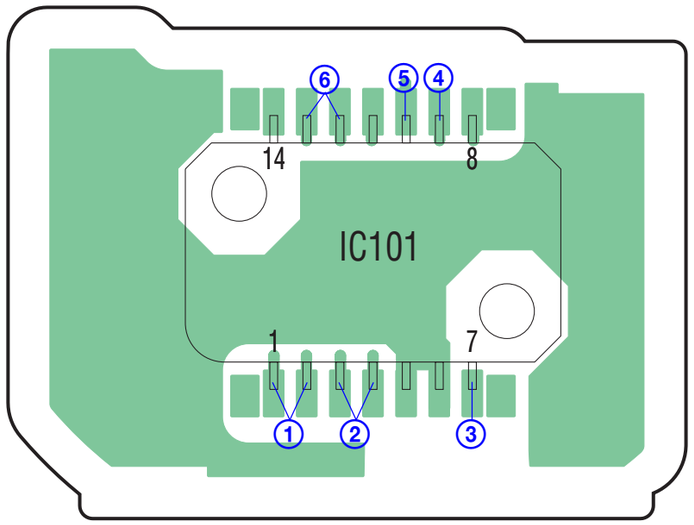
BOARD INFORMATION

board name	parts location (shown on page)	pattern	
		number of layers	layers not shown
CD-493	–	2	–
IR-052	–	2	–
CR-047	4-73	2	–
LB-096	–	2	–
SE-140	4-73	2	–
PD-213	4-74	2	–
MS-201	4-74	2	–
VC-350	4-75 to 77	8	2 to 7

4-3. PRINTED WIRING BOARDS

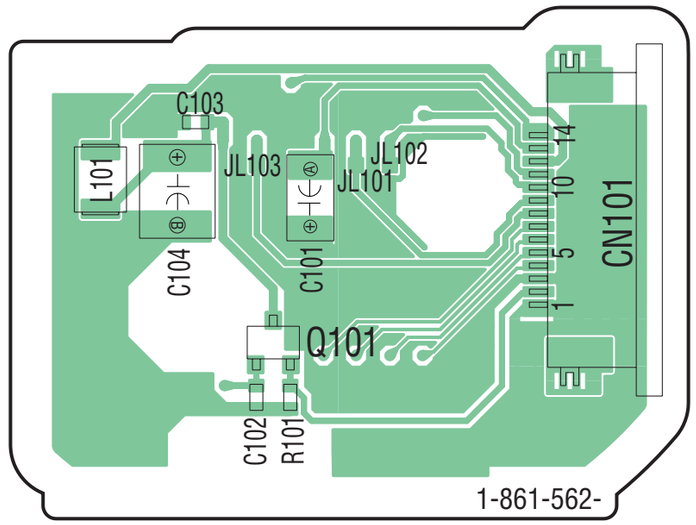
• Refer to page 4-51 for common note for printed wiring board. • : Uses unleaded solder.

CD-493 BOARD(SIDE A)

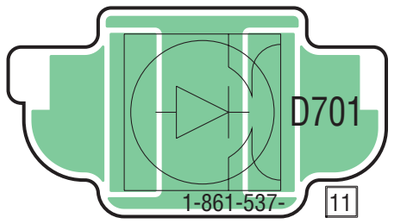


IC101 is not included in the COMPLETE board of CD-493.

CD-493 BOARD(SIDE B)

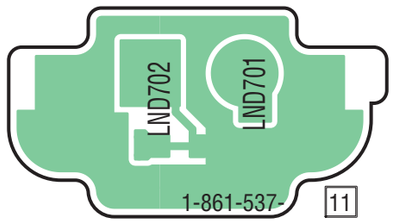


IR-052 BOARD (SIDE A)



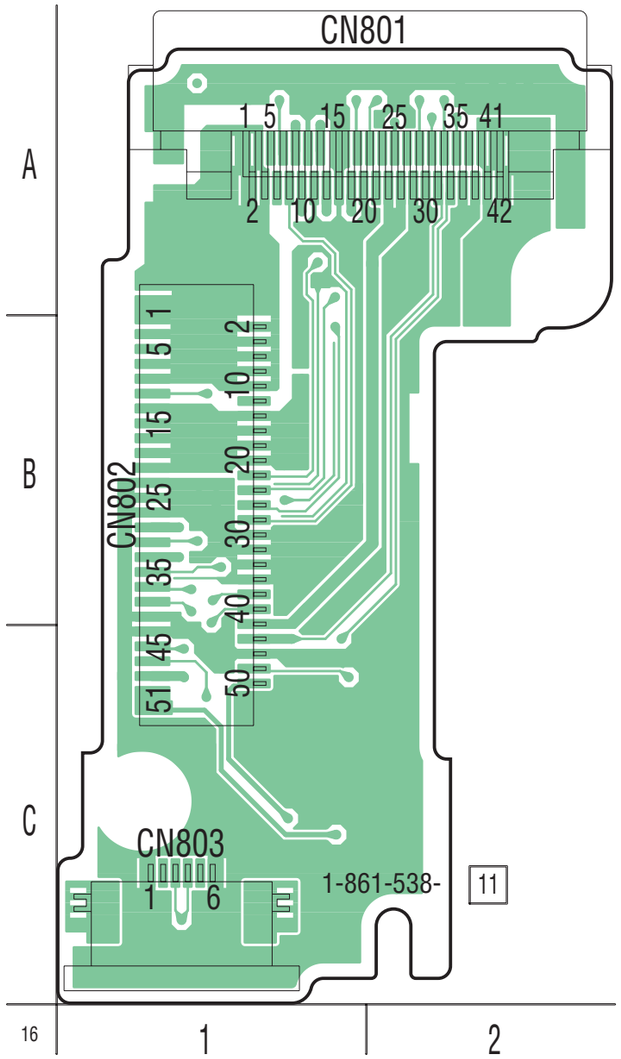
(NIGHT SHOT)

IR-052 BOARD (SIDE B)

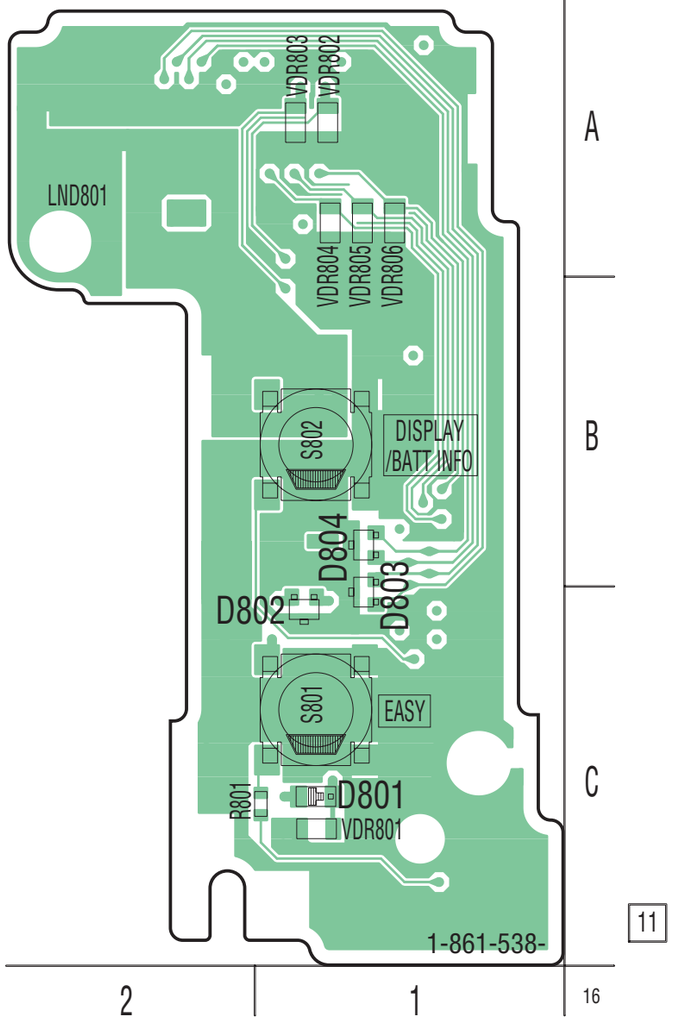


• Refer to page 4-51 for common note for printed wiring board. • : Uses unleaded solder.

CR-047 BOARD(SIDE A)

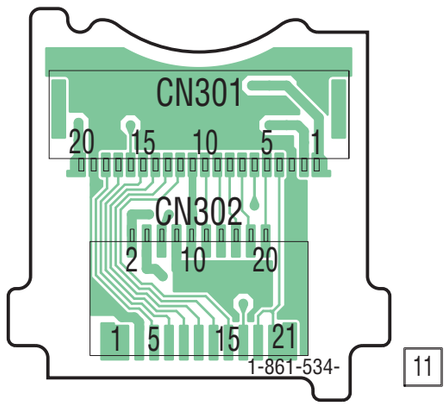


CR-047 BOARD(SIDE B)

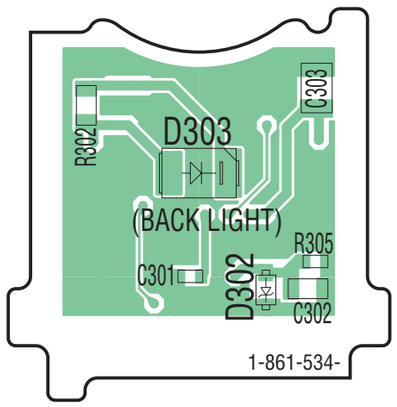


• Refer to page 4-51 for common note for printed wiring board. • : Uses unleaded solder.

LB-096 BOARD (SIDE A)



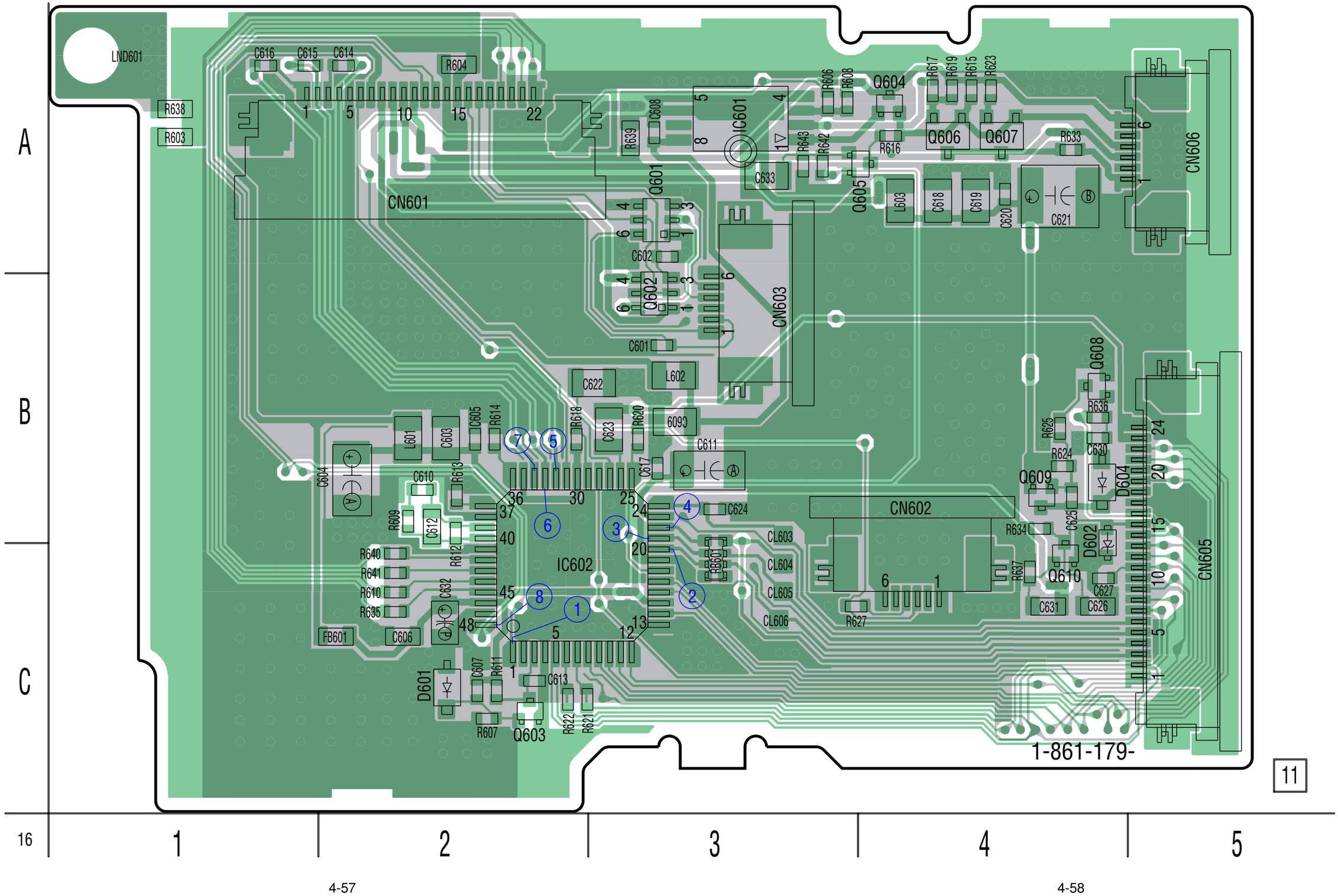
LB-096 BOARD (SIDE B)



• Refer to page 4-51 for common note for printed wiring board.

• : Uses unleaded solder.

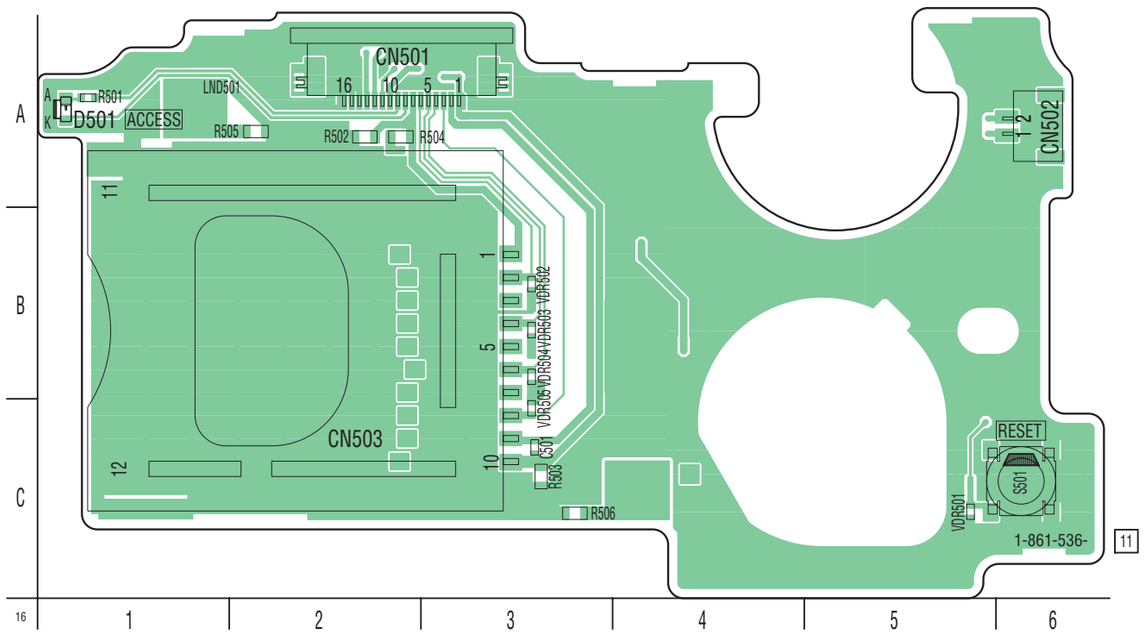
PD-213 BOARD



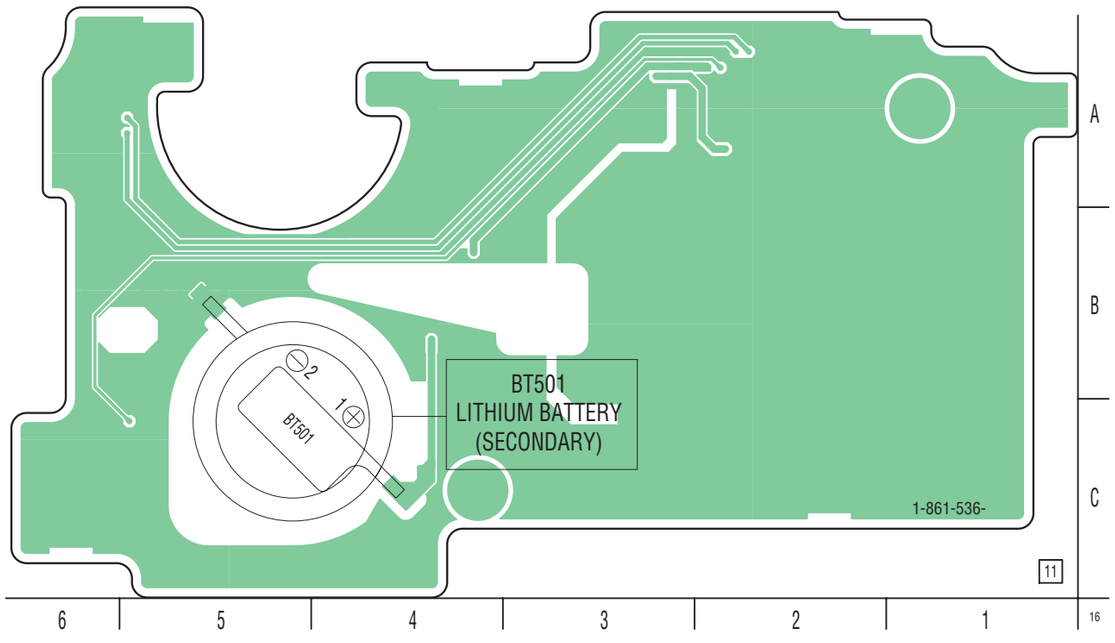
• Refer to page 4-51 for common note for printed wiring board.

• : Uses unleaded solder.

MS-201 BOARD(SIDE A)

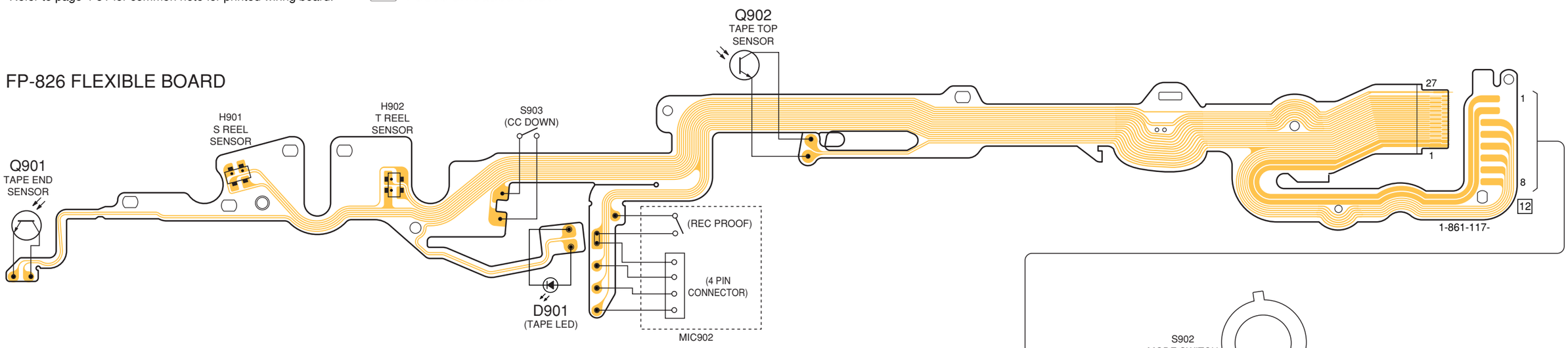


MS-201 BOARD(SIDE B)

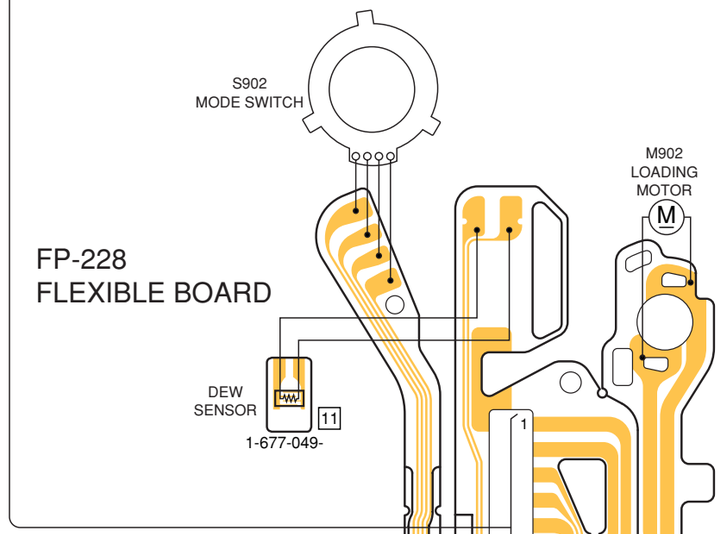


• Refer to page 4-51 for common note for printed wiring board. • : Uses unleaded solder.

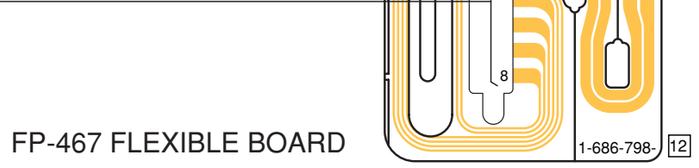
FP-826 FLEXIBLE BOARD



FP-228 FLEXIBLE BOARD

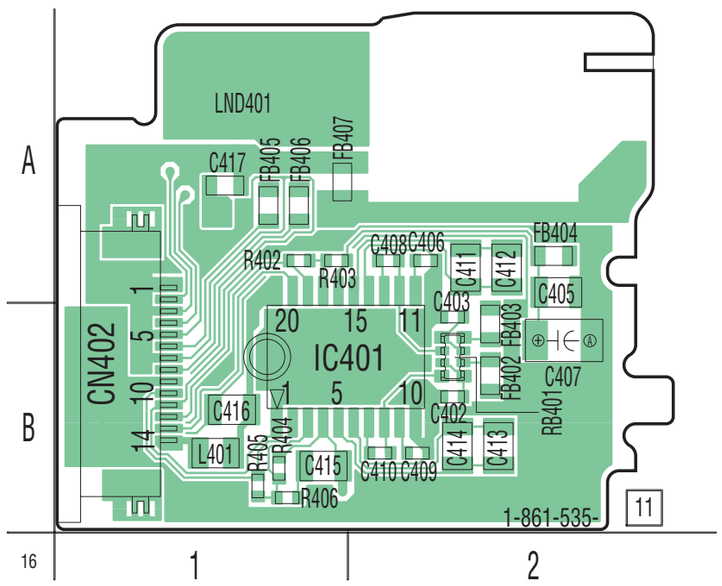


FP-467 FLEXIBLE BOARD

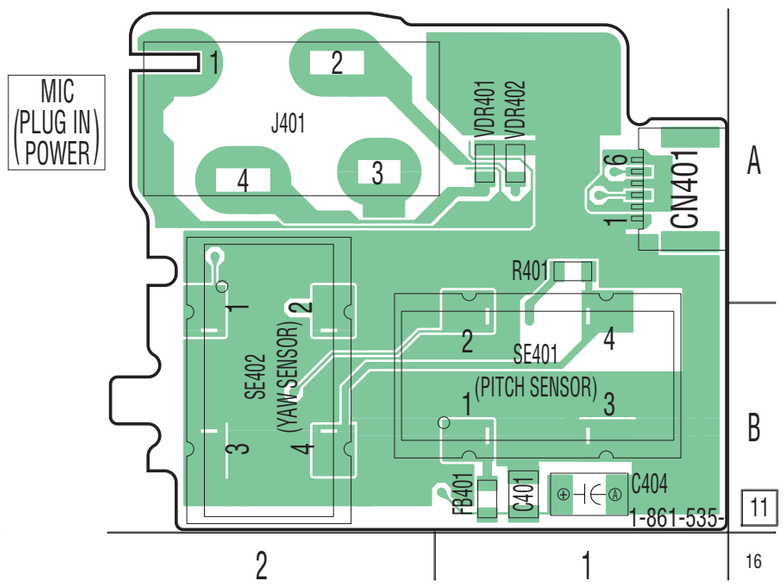


• Refer to page 4-51 for common note for printed wiring board. • : Uses unleaded solder.

SE-140 BOARD(SIDE A)



SE-140 BOARD(SIDE B)



Printed wiring board of the VC-350 board are not shown.
Pages from 4-63 to 4-70 are not shown.

4-3. PRINTED WIRING BOARDS

4-4. MOUNTED PARTS LOCATION

no mark : side A
* mark : side B

CR-047 BOARD

CN801	A-1
CN802	B-1
CN803	C-1
* D801	C-1
* D802	C-1
* D803	B-1
* D804	B-1
* R801	C-1
* S801	C-1
* S802	B-1
* VDR801	C-1
* VDR802	A-1
* VDR803	A-1
* VDR804	A-1
* VDR805	A-1
* VDR806	A-1

SE-140 BOARD

* C401	B-1
C402	B-2
C403	B-2
* C404	B-1
C405	A-2
C406	A-2
C407	B-2
C408	A-2
C409	B-2
C410	B-2
C411	A-2
C412	A-2
C413	B-2
C414	B-2
C415	B-1
C416	B-1
C417	A-1
* CN401	A-1
CN402	B-1
* FB401	B-1
FB402	B-2
FB403	B-2
FB404	A-2
FB405	A-1
FB406	A-1
FB407	A-1
IC401	B-1
J401	A-2
L401	B-1
* R401	A-1
R402	A-1
R403	A-1
R404	B-1
R405	B-1
R406	B-1
RB401	B-2
* SE401	B-1
* SE402	B-2
* VDR401	A-1
* VDR402	A-1

4-3. PRINTED WIRING BOARDS

no mark : side A
* mark : side B

PD-213 BOARD

C601	B-3	R603	A-1
C602	A-3	R604	A-2
C603	B-2	R606	A-3
C604	B-2	R607	C-2
C605	B-2	R608	A-3
C606	C-2	R609	B-2
C607	C-2	R610	C-2
C608	A-3	R611	C-2
C609	B-3	R612	B-2
C610	B-2	R613	B-2
C611	B-3	R614	B-2
C612	B-2	R615	A-4
C613	C-2	R616	A-4
C614	A-2	R617	A-4
C615	A-1	R618	B-2
C616	A-1	R619	A-4
C617	B-3	R620	B-3
C618	A-4	R621	C-2
C619	A-4	R622	C-2
C620	A-4	R623	A-4
C621	A-4	R624	B-4
C622	B-3	R625	B-4
C623	B-3	R627	C-3
C624	B-3	R633	A-4
C625	B-4	R634	B-4
C626	C-4	R635	C-2
C627	C-4	R636	B-4
C630	B-4	R637	C-4
C631	C-4	R638	A-1
C632	C-2	R639	A-3
C633	A-3	R640	C-2
		R641	C-2
CN601	A-2	R642	A-3
CN602	B-4	R643	A-3
CN603	B-3		
CN605	C-2	RB601	C-3
CN606	A-5		
D601	C-2		
D602	B-4		
D604	B-4		
FB601	C-2		
IC601	A-3		
IC602	C-2		
L601	B-2		
L602	B-3		
L603	A-4		
Q601	A-3		
Q602	B-3		
Q603	C-2		
Q604	A-4		
Q605	A-4		
Q606	A-4		
Q607	A-4		
Q608	B-4		
Q609	B-4		
Q610	C-4		

MS-201 BOARD

* BT501	C-5
C501	C-3
CN501	A-2
CN502	A-6
D501	A-1
R501	A-1
R502	A-2
R503	C-3
R504	A-2
R505	A-2
R506	C-3
S501	C-6
VDR501	C-5
VDR502	B-3
VDR503	B-3
VDR504	B-3
VDR505	C-3

Mounted parts location of the VC-350 board is not shown.
Pages from 4-75 to 4-77 are not shown.

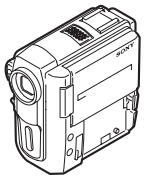
NOTE

5. REPAIR PARTS LIST

NOTE: Characters A to Z of the electrical parts list indicate location of exploded views in which the desired part is shown.

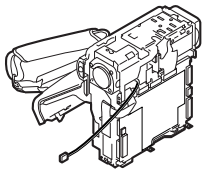
Link

EXPLODED VIEWS



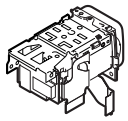
A

OVERALL SECTION



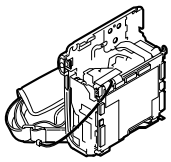
B

MAIN CHASSIS (LENS) SECTION



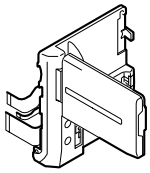
C

EVF SECTION



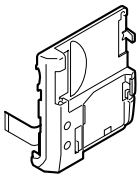
D

CABINET (L) SECTION



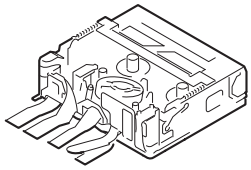
E

CABINET (R) SECTION-1

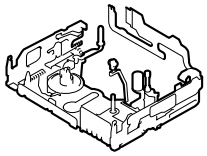


F

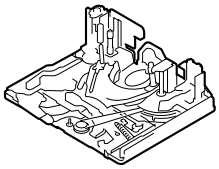
CABINET (R) SECTION-2



OVERALL (MECHANISM DECK-Z200)



LS CHASSIS BLOCK ASSEMBLY



MECHANISM CHASSIS BLOCK ASSEMBLY

Link

ELECTRICAL PARTS LIST

ACCESSORIES

CD-493 BOARD B	IR-052 BOARD	SE-140 BOARD C
CR-047 BOARD F	LB-096 BOARD C	VC-350 BOARD D
FP-840 BOARD A	MS-201 BOARD D	
FP-926 BOARD	PD-213 BOARD E	

5. REPAIR PARTS LIST

NOTE:

- -XX, -X mean standardized parts, so they may have some differences from the original one.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- CAPACITORS:
  uF: µF
- COILS
  uH: µH
- RESISTORS
  All resistors are in ohms.
  METAL: metal-film resistor
  METAL OXIDE: Metal Oxide-film resistor
  F: nonflammable
- SEMICONDUCTORS
  In each case, u: µ, for example:
  uA...: µA... , uPA... , µPA... ,
  uPB... , µPB... , uPC... , µPC... ,
  uPD..., µPD...

When indicating parts by reference number, please include the board name.

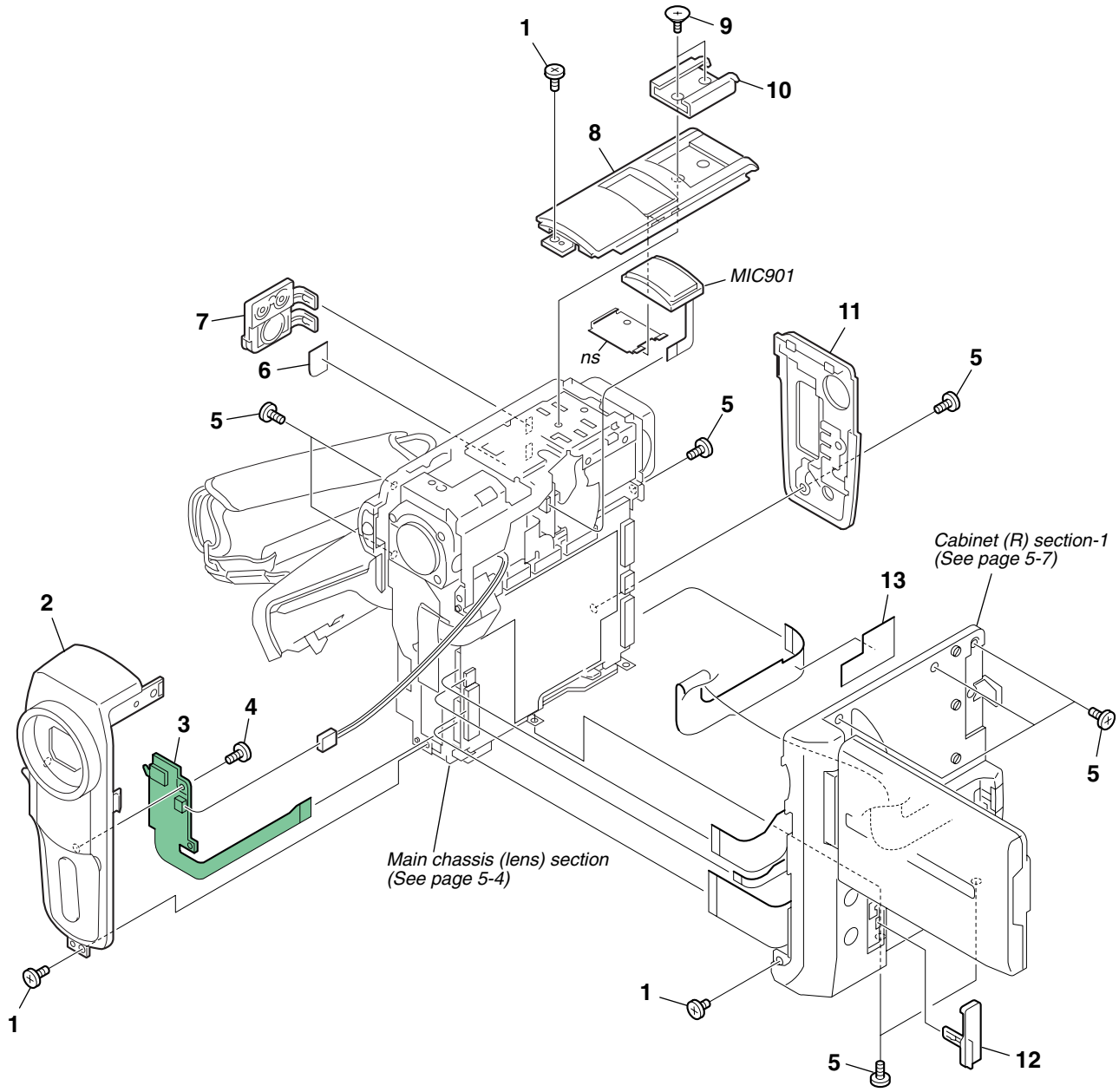
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

5. REPAIR PARTS LIST

5-1. EXPLODED VIEWS

5-1-1. OVERALL SECTION

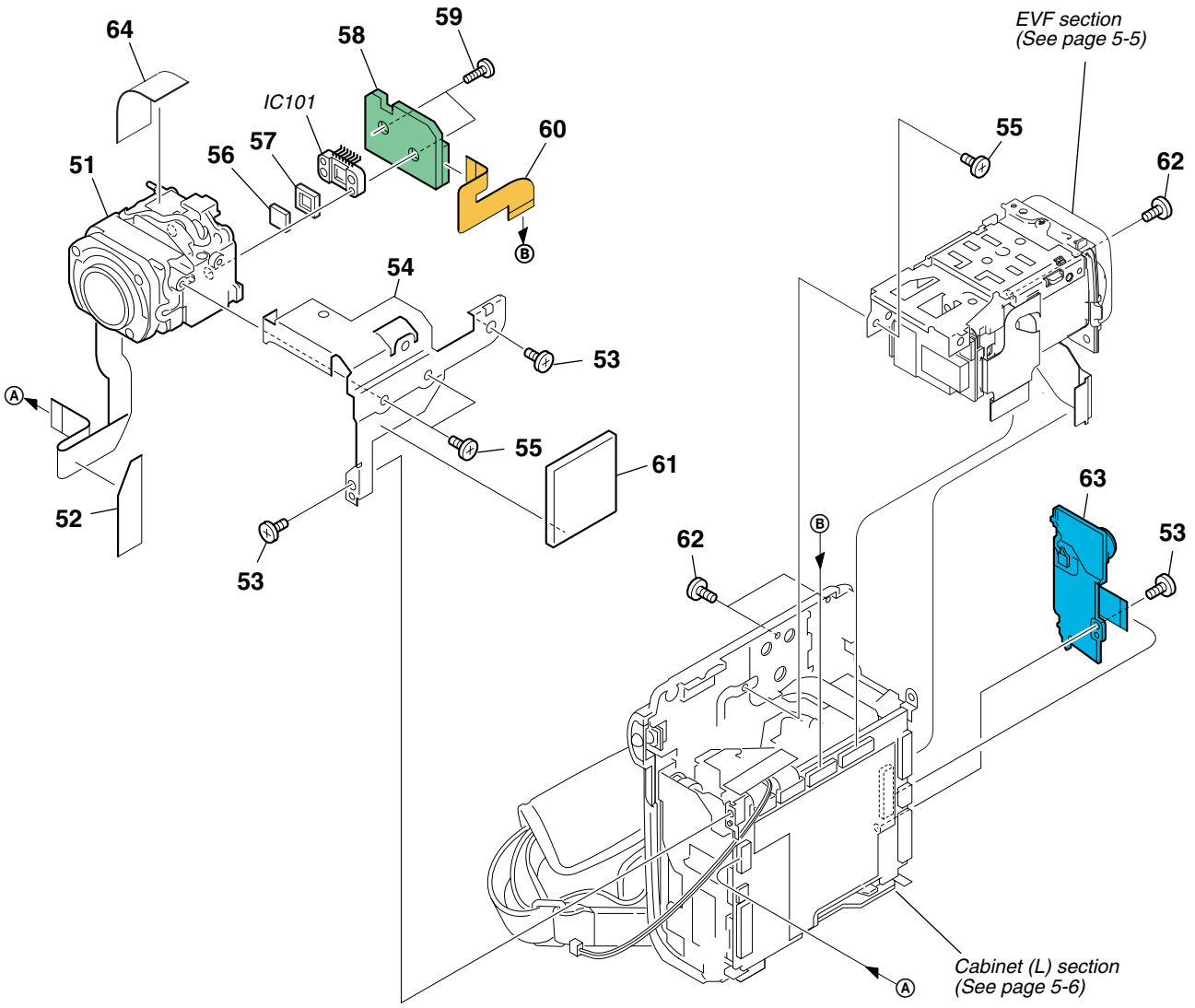
ns : not supplied



Ref. No.	Part No.	Description
1	3-989-735-11	SCREW (M1.7), LOCK ACE, P2
2	X-3954-131-1	PANEL ASSY (N), FRONT
3	A-7112-500-A	FP-840 BOARD, COMPLETE
4	3-080-204-01	SCREW, TAPPING, P2
5	3-989-735-31	SCREW (M1.7), LOCK ACE, P2
6	3-089-561-21	SHEET, JACK
7	3-090-134-01	COVER (L), JACK
8	X-3954-422-1	CABINET (UPPER) (N) ASSY
9	3-067-187-11	ACE, PLATE SCREW (M2) LOCK
10	3-067-469-21	SHOE, ACCESSORY
11	X-3954-259-1	PANEL ASSY, REAR
12	3-089-941-02	COVER, DCIN
13	3-091-704-01	SHEET, ADHESIVE, BT FLEXIBLE
MIC901	1-542-573-11	MICROPHONE UNIT (960H)

5. REPAIR PARTS LIST

5-1-2. MAIN CHASSIS (LENS) SECTION



Ref. No.	Part No.	Description
51	8-848-778-01	DEVICE, LENS LSV-920A
52	3-090-129-01	INSULATING SHEET,CR
53	3-989-735-11	SCREW (M1.7), LOCK ACE, P2
54	3-089-948-01	FRAME (N), LENS
55	3-080-204-01	SCREW, TAPPING, P2
56	1-788-059-11	FILTER BLOCK, OPTICAL
57	3-091-333-01	RUBBER, SEAL
58	A-7112-555-A	CD-493 BOARD, COMPLETE (IC101 is not included in this board.)

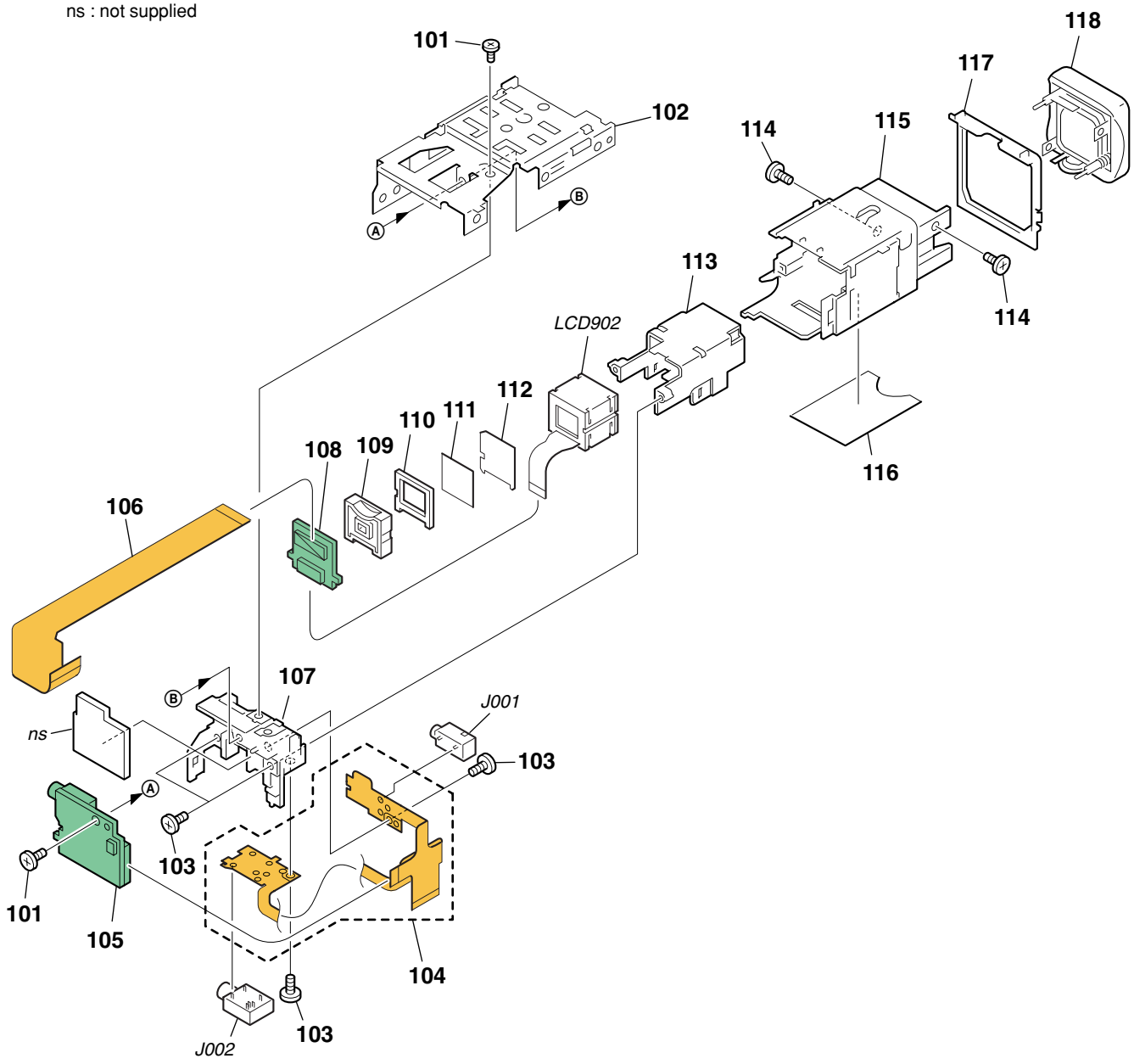
Ref. No.	Part No.	Description
59	3-087-382-11	SCREW (B1.7), TAPPING
60	1-861-539-11	FP-838 FLEXIBLE BOARD
61	3-091-298-01	SPACER (N), FRAME
62	3-989-735-31	SCREW (M1.7), LOCK ACE, P2
63	1-478-542-21	KEY BLOCK, CONTROL (SS6800)
64	3-090-319-01	SHEET, NS
IC101	A-7112-773-A	CCD BLOCK ASSY (960HP) (CCD IMAGER) (IC101 is not included in the COMPLETE board of CD-493.)

Be sure to read “Precautions upon replacing CCD imager” on page 4-5 when changing the CCD imager.

5. REPAIR PARTS LIST

5-1-3. EVF SECTION

ns : not supplied



Ref. No.	Part No.	Description
101	3-078-890-11	SCREW, TAPPING
102	3-089-441-01	FRAME (N), SHOE
103	3-080-204-01	SCREW, TAPPING, P2
104	1-861-544-11	FP-843 FLEXIBLE BOARD
105	A-7112-558-A	SE-140 BOARD, COMPLETE
106	1-861-543-11	FP-842 FLEXIBLE BOARD
107	X-3954-127-1	HOLDER ASSY, E PARTS
108	A-7112-556-A	LB-096 BOARD, COMPLETE
109	3-089-447-01	GUIDE, LAMP
110	3-089-448-01	CUSHION, LB
111	3-089-445-01	ILLUMINATOR

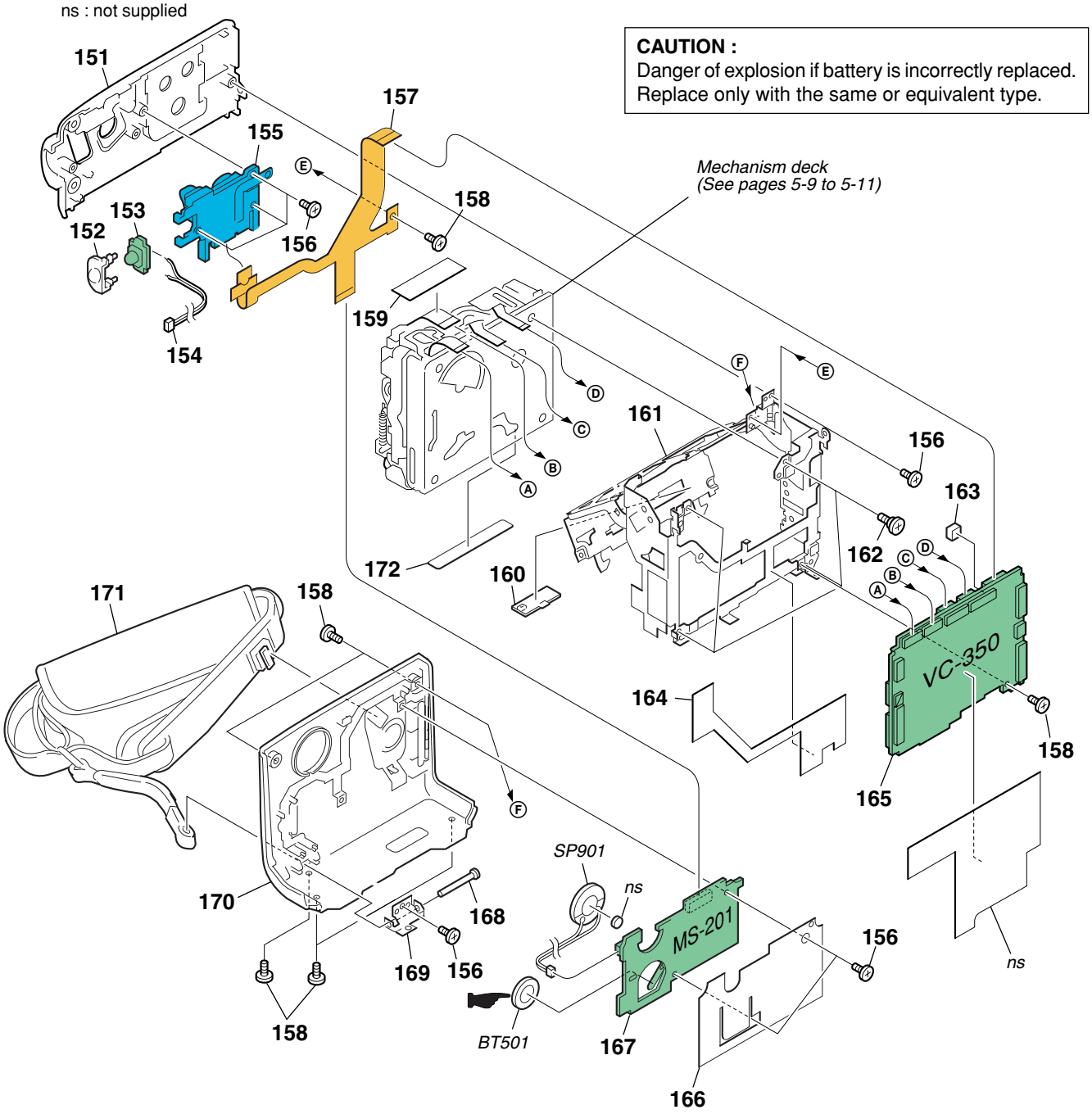
Ref. No.	Part No.	Description
112	3-089-446-01	SHEET, PRISM
113	3-089-443-01	CABINET, VF (LCD)
114	3-389-523-16	SCREW (LOCK ACE)
115	X-3954-130-1	SLIDE ASSY, VF
116	3-090-069-01	RETAINER, VF FLEXIBLE
117	3-089-435-11	FRAME, ORNAMENTAL, VF
118	X-3954-125-1	EYE CUP ASSY
LCD902	8-753-208-84	LCX059ALA-1
J001	1-793-995-11	JACK, SUPER SMALL TYPE (LANC)
J002	1-778-040-11	JACK, SMALL TYPE (A/V OUT)

5. REPAIR PARTS LIST

5-1-4. CABINET (L) SECTION

ns : not supplied

CAUTION :
Danger of explosion if battery is incorrectly replaced.
Replace only with the same or equivalent type.



: BT501 (Lithium battery) MS-201 board on the mount position. (See page 4-59)

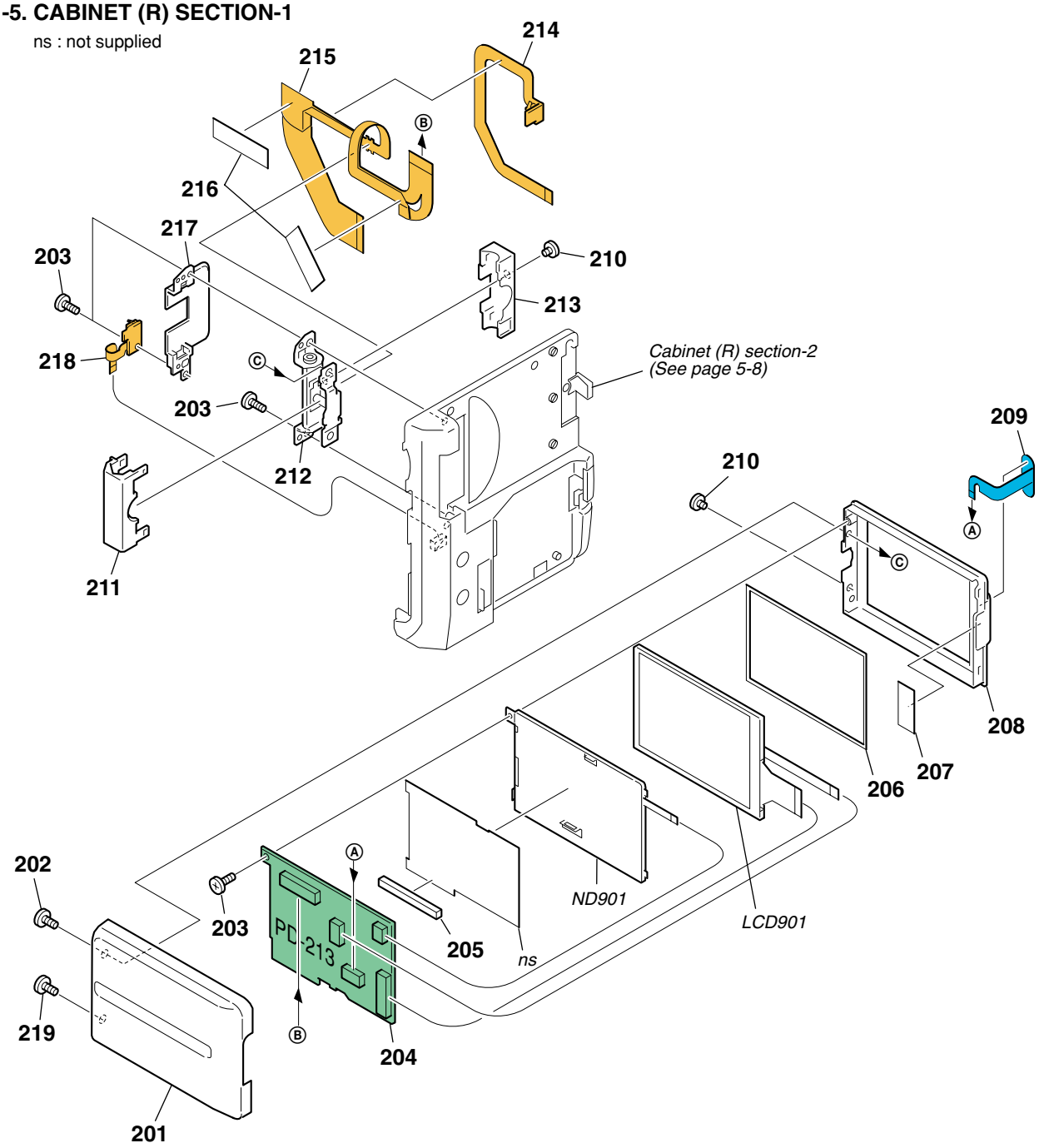
Ref. No.	Part No.	Description
151	X-3954-250-1	CABINET (L) ASSY (N)
152	3-090-125-01	WINDOW, NS
153	A-7112-497-A	IR-052 BOARD, COMPLETE
154	1-962-696-11	HARNESS (RR-057)
155	1-478-541-11	KEY BLOCK, CONTROL (ZM6800)
156	3-080-204-01	SCREW, TAPPING, P2
157	1-861-545-12	FP-844 FLEXIBLE BOARD
158	3-989-735-11	SCREW (M1.7), LOCK ACE, P2
159	3-941-343-01	TAPE (A)
160	3-075-309-01	KNOB, EJECT
161	X-3954-136-1	FRAME ASSY, CS
162	3-062-214-01	SCREW (M1.4X1.5)
163	3-089-521-01	SHEET, VC

Ref. No.	Part No.	Description
164	3-091-234-01	SHEET, INSULATING, VC
165	A-7113-061-A	VC-350 BOARD, COMPLETE (SERVICE) (PC107E)
165	A-7113-062-A	VC-350 BOARD, COMPLETE (SERVICE) (PC106E)
166	3-089-639-01	SHEET, LI
167	A-7112-557-A	MS-201 BOARD, COMPLETE
168	3-082-574-01	SHAFT, BELT
169	3-090-930-01	BRACKET (FRONT), BELT
170	X-3954-245-1	CABINET (G) ASSY (O)
171	X-3954-138-1	BELT ASSY, GRIP
172	3-081-221-01	LABEL (Z), LS
SP901	1-825-261-21	LOUD SPEAKER (1.6CM)

5. REPAIR PARTS LIST

5-1-5. CABINET (R) SECTION-1

ns : not supplied



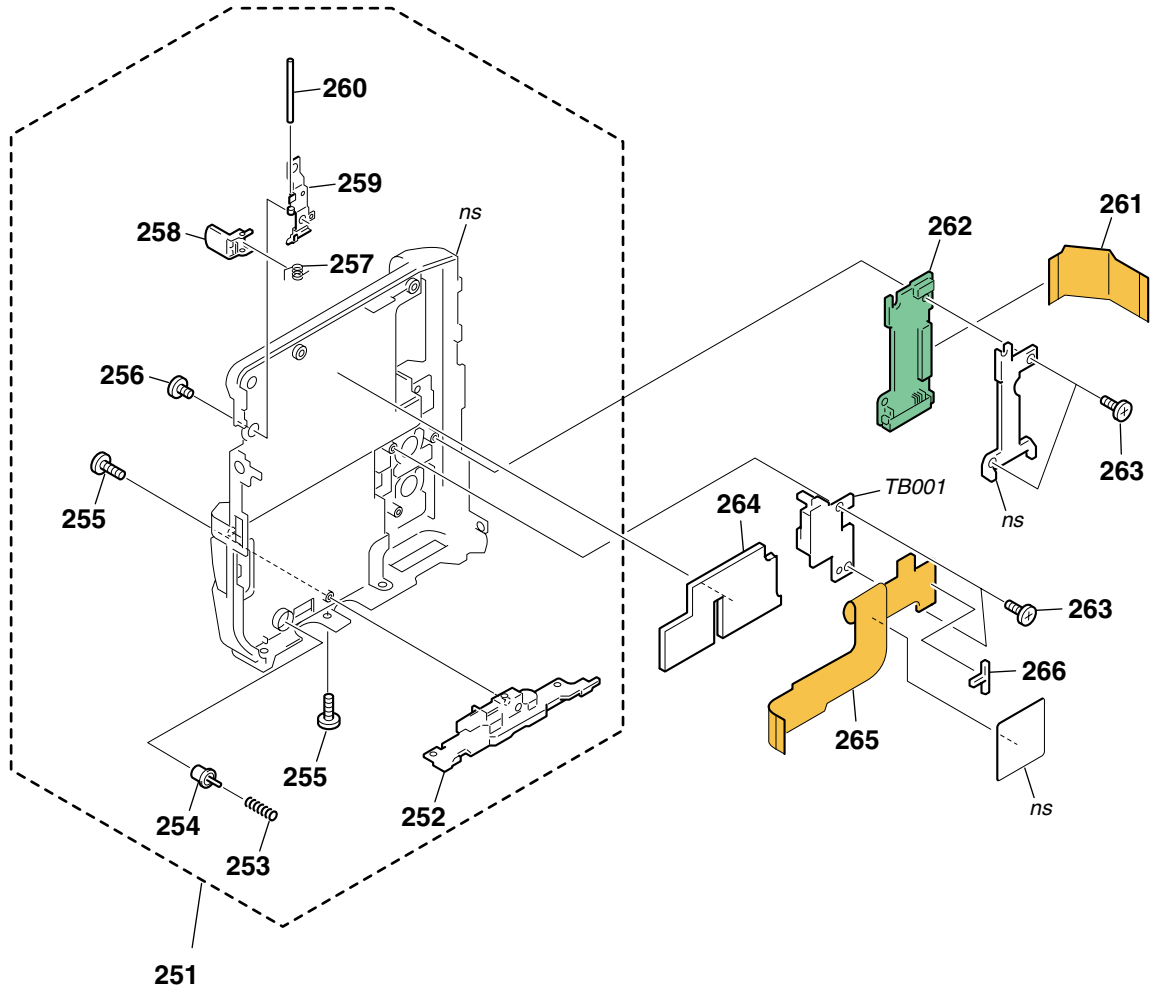
Ref. No.	Part No.	Description
201	X-3954-407-1	CABINET (C) (N) ASSY, P (PC106E)
201	X-3954-408-1	CABINET (C) (N) ASSY, P (PC107E)
202	3-080-198-21	SCREW(M1.7),LOCK ACE,P2
203	3-080-204-21	SCREW, TAPPING, P2
204	A-7112-498-A	PD-213 BOARD, COMPLETE
205	3-090-065-01	CUSHION, BL
206	3-090-062-01	CUSHION, TP
207	3-090-064-01	SHEET, LIGHT
208	X-3954-420-1	CABINET (M) ASSY, P
209	1-478-483-21	KEY BLOCK, CONTROL (SB6300)
210	3-989-735-11	SCREW (M1.7), LOCK ACE, P2

Ref. No.	Part No.	Description
211	3-089-470-01	COVER (C), HINGE
212	X-3954-070-1	HINGE (63) ASSY
213	3-089-473-01	COVER (M), HINGE
214	A-7112-499-A	FP-926 BOARD, COMPLETE
215	1-861-549-11	FP-848 FLEXIBLE BOARD
216	3-941-343-01	TAPE (A)
217	3-089-943-01	BLIND, HINGE
218	1-861-548-11	FP-847 FLEXIBLE BOARD
219	3-078-890-01	SCREW, TAPPING
ND901	1-478-462-21	BLOCK, LIGHT GUIDE PLATE (2.5)
LCD901	8-753-205-50	ACX528AKP-J

5. REPAIR PARTS LIST

5-1-6. CABINET (R) SECTION-2

ns : not supplied

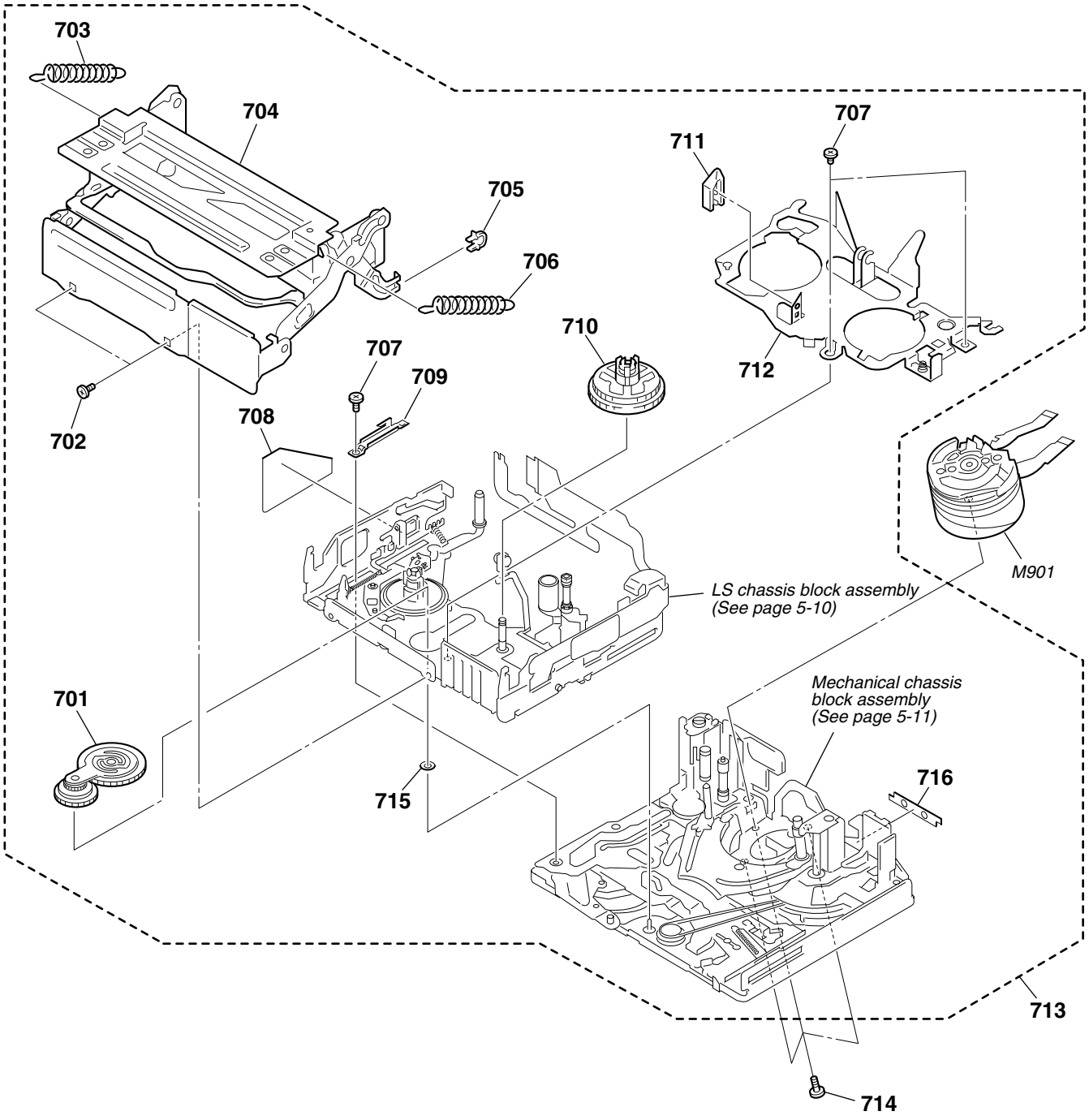


Ref. No.	Part No.	Description
251	X-3954-209-1	CABINET (R) ASSY (E)
252	3-089-938-01	FRAME, BOTTOM
253	3-089-931-01	SPRING, LIFTER
254	3-089-930-01	LIFTER, BT
255	3-989-735-31	SCREW (M1.7), LOCK ACE, P2
256	3-989-735-11	SCREW (M1.7), LOCK ACE, P2
257	3-089-933-01	SPRING, PANEL LOCK
258	3-089-932-01	KNOB, PANEL LOCK
259	3-089-934-01	RETAINER, PANEL LOCK

Ref. No.	Part No.	Description
260	3-669-481-05	PIN (DIA. 1X15), PARALLEL
261	1-861-547-11	FP-846 FLEXIBLE BOARD
262	A-7112-502-A	CR-047 BOARD, COMPLETE
263	3-080-204-21	SCREW, TAPPING, P2
264	3-090-127-01	SPACER, FLEXIBLE
265	1-861-542-11	FP-841 FLEXIBLE BOARD
266	3-089-942-01	SHEET
TB001	1-694-950-11	TERMINAL BOARD, BATTERY

5. REPAIR PARTS LIST

5-1-7. OVERALL (MECHANISM DECK-Z200)



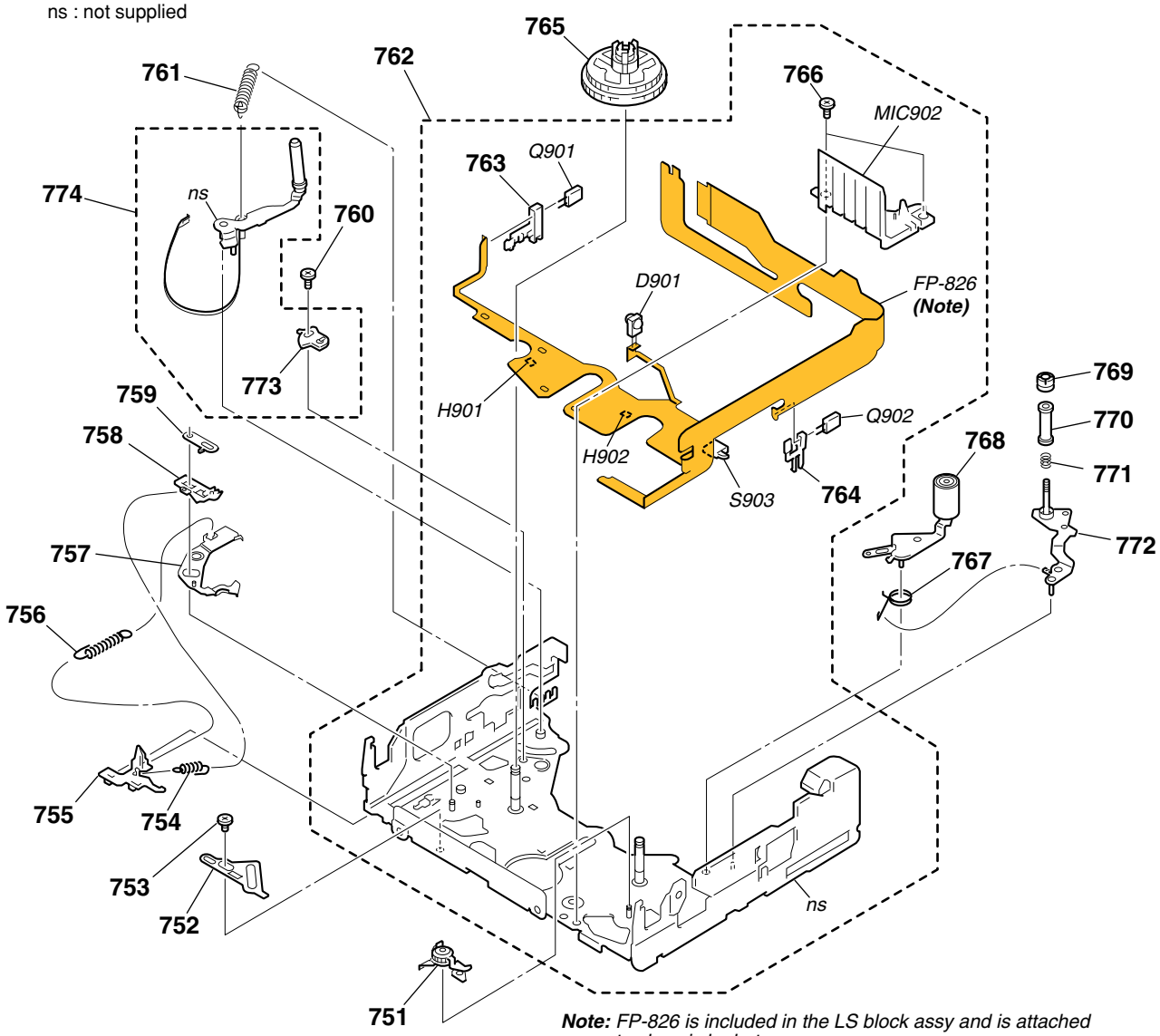
Ref. No.	Part No.	Description
701	X-3952-938-3	GEAR ASSY, GOOSENECK
702	3-075-097-11	SCREW (M1.4X1.4), SPECIAL HEAD
703	3-079-206-02	SPRING (POP UP S), TXTENSION
704	X-3952-939-3	COMPARTMENT ASSY, CASSETTE
705	3-079-367-01	DAMPER, CASSETTE COMPARTMENT
706	3-079-215-02	SPRING (POP UP T), EXTENSION
707	3-085-330-01	SCREW, SPECIAL
708	3-080-545-01	COVER, SENSOR S
709	3-079-364-01	RETAINER, LS GUIDE

Ref. No.	Part No.	Description
710	X-3952-937-1	TABLE ASSY, T REEL
711	3-079-366-01	RELEASE, REEL LOCK
712	X-3953-257-1	PLATE ASSY,RETAINER
713	A-7095-947-A	MD (Z200) SUB ASSY
714	3-079-741-02	SCREW,DRUM FIXING
715	3-748-682-01	WASHER, T
716	3-087-881-01	SHEET, ADHESIVE, FLEXIBLE
M901	A-7048-994-A	DRUM (DEH-30B-R)

5. REPAIR PARTS LIST

5-1-8. LS CHASSIS BLOCK ASSEMBLY

ns : not supplied



Note: *FP-826 is included in the LS block assy and is attached to chassis by hot-press.*
Because installation of FP-826 requires a very high accuracy, FP-826 is not supplied as an independent service parts.

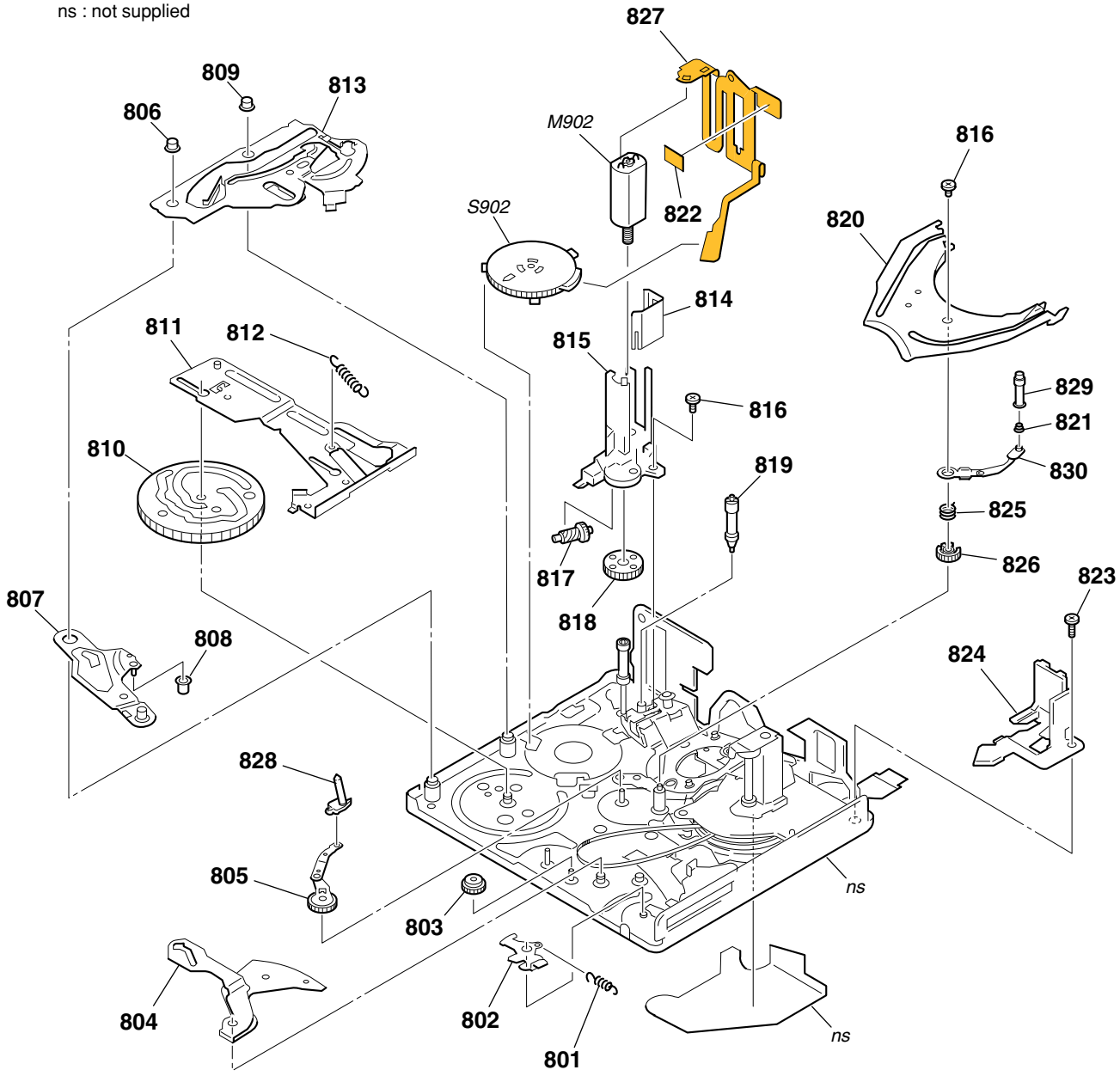
Ref. No.	Part No.	Description
751	A-7095-402-B	BRAKE (T) BLOCK ASSY
752	3-079-241-01	PLATE, LS CAM
753	3-075-097-11	SCREW (M1.4X1.4), SPECIAL HEAD
754	3-079-246-01	SPRING(RELEASE RACK),EXTENSION
755	3-079-248-01	POSITIONING(S), CASSETTE
756	3-079-244-01	SPRING (ULE), EXTENSION
757	X-3952-932-1	BRAKE ASSY, ULE
758	3-079-245-01	RACK (S), RELEASE
759	3-079-247-01	BRAKE (S)
760	3-059-090-11	SCREW (M1.4X2.5), SPECIAL HEAD
761	3-079-242-01	SPRING, TENSION
762	A-7095-951-A	LS BLOCK ASSY
763	3-079-267-01	HOLDER (S), SENSOR
764	3-079-268-01	HOLDER (T), SENSOR
765	X-3952-936-2	TABLE ASSY, S REEL
766	3-085-330-01	SCREW, SPECIAL

Ref. No.	Part No.	Description
767	3-079-243-02	SPRING (PINCH RETURN), TORSION
768	X-3952-934-1	ARM ASSY, PINCH
769	3-052-062-02	NUT, TG7
770	3-079-219-02	TG7
771	3-081-591-01	SPRING, COMPRESSION (TG7)
772	X-3952-935-3	ARM ASSY, TG7
773	3-079-237-01	ADJUSTOR, BAND
774	A-7095-403-B	TG2 ARM BLOCK ASSY
D901	6-500-652-01	DIODE GL453SE0000F (TAPE LED)
H901	8-719-067-74	ELEMENT, HOLE HW-105A-CDE-T (S REEL)
H902	8-719-067-74	ELEMENT, HOLE HW-105A-CDE-T (T REEL)
MIC902	1-817-175-12	PIN, CONNECTOR (WITH DETECTION SWITCH)
S903	1-529-566-51	SWITCH, PUSH (1 KEY) (C.C.DOWN)
Q901	6-550-672-01	TRANSISTOR PT4850FJE00F (TAPE END)
Q902	6-550-672-01	TRANSISTOR PT4850FJE00F (TAPE TOP)

5. REPAIR PARTS LIST

5-1-9. MECHANISM CHASSIS BLOCK ASSEMBLY

ns : not supplied



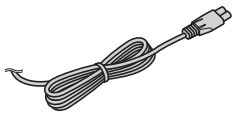
Ref. No.	Part No.	Description
801	3-079-314-01	SPRING (EJ), EXTENSION
802	3-079-327-01	ARM, EJ
803	3-079-323-01	GEAR, CONVERSION
804	3-079-324-01	ARM, GL DRIVING
805	X-3952-928-1	GL (S) ASSY
806	3-079-315-01	ROLLER (S1), LS GUIDE
807	X-3952-925-1	ARM ASSY, LS
808	3-079-320-01	ROLLER, LS
809	3-079-316-01	ROLLER (S2), LS GUIDE
810	3-079-319-01	GEAR, CAM
811	X-3952-941-1	SLIDER ASSY (N), M
812	3-079-321-02	SPRING (PINCH), EXTENSION
813	X-3952-940-2	PLATE ASSY, TG2 CAM
814	3-079-312-01	SHIELD, MOTOR
815	3-079-307-02	HOLDER, MOTOR
816	3-085-330-01	SCREW, SPECIAL

Ref. No.	Part No.	Description
817	3-079-308-01	SHAFT, WORM
818	3-079-309-01	GEAR, DECELERATION
819	X-3952-942-2	ROLLER ASSY, TG3
820	3-079-325-01	RAIL, GUIDE
821	3-079-295-02	SPRING, TG5
822	1-677-049-11	FP-228 FLEXIBLE BOARD (DEW SENSOR)
823	3-079-328-01	SCREW (M1.4), SPECIAL HEAD
824	3-079-326-02	SUPPORT, TG7
825	3-079-301-01	SPRING (GLT), TORSION
826	3-079-298-01	GEAR (T), GL
827	1-686-798-11	FP-467 FLEXIBLE BOARD
828	X-3952-927-2	COASTER (S) ASSY
829	X-3952-930-3	ROLLER ASSY, TG5
830	X-3952-929-1	COASTER (T) ASSY
M902	A-7095-396-A	MOTOR BLOCK ASSY, L (LOARDING)
S902	1-477-679-11	ROTARY, ENCODER (MODE SWITCH)

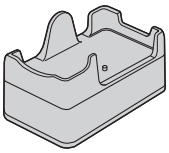
5. REPAIR PARTS LIST

Checking supplied accessories.

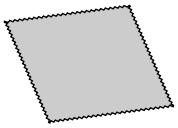
Make sure that the following accessories are supplied with your camcorder.



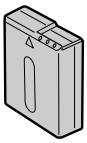
Power cord (Main lead) (1)
(AEP, EE, NE model)
⚠ 1-769-608-11
Power cord (Main lead) (1)
(UK model)
⚠ 1-783-374-11



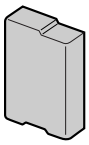
Handycam station (1)
(DCRA-C112)
(PC107E)
1-818-213-31
(DCRA-C113)
(PC106E)
1-818-213-41



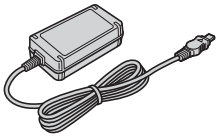
Cleaning cloth (1)
3-073-861-01



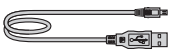
Rechargeable battery pack
(NP-FF51) (1)
A-7097-021-A



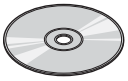
Battery terminal cover (1)
3-070-945-11



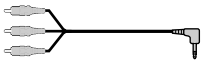
AC Adaptor
(AC-L25A/L25B) (1)
⚠ 1-477-534-11



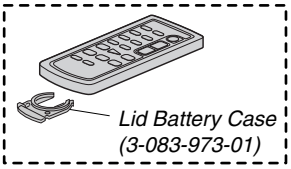
USB cable (1)
1-824-382-21



CD-ROM
(SPVD-012 USB Driver) (1)
3-087-821-01



A/V connecting cable (1)
1-824-097-11



Wireless Remote Commander
(RMT-830) (1)
1-477-898-71

21-pin adaptor (1)
1-770-783-21

• Abbreviation
EE : East European model
NE : North European model

Other accessories

3-087-936-11 MANUAL (PC), INSTRUCTION(ENGLISH) (PC106E:AEP,UK/PC107E:AEP,UK)
3-087-936-21 MANUAL (PC), INSTRUCTION(FRENCH) (PC106E:AEP/PC107E:AEP)
3-087-936-31 MANUAL (PC), INSTRUCTION(SPANISH/PORTUGUESE) (PC106E:AEP/PC107E:AEP)
3-087-936-41 MANUAL (PC), INSTRUCTION(ITALIAN/GREEK) (PC106E:AEP/PC107E:AEP)
3-087-936-51 MANUAL (PC), INSTRUCTION(GERMAN/DUTCH) (PC106E:AEP/PC107E:AEP)
3-087-936-61 MANUAL (PC), INSTRUCTION(SWEDISH/RUSSIAN) (PC107E:NE)
3-087-936-71 MANUAL (PC), INSTRUCTION(DANISH/FINNISH) (PC107E:NE)
3-089-179-11 MANUAL, INSTRUCTION(ENGLISH) (PC106E:AEP,UK/PC107E:AEP,UK)
3-089-179-21 MANUAL, INSTRUCTION(FRENCH) (PC106E:AEP/PC107E:AEP)
3-089-179-31 MANUAL, INSTRUCTION(SPANISH/PORTUGUESE) (PC106E:AEP/PC107E:AEP)
3-089-179-41 MANUAL, INSTRUCTION(ITALIAN/GREEK) (PC106E:AEP/PC107E:AEP)
3-089-179-51 MANUAL, INSTRUCTION(GERMAN/DUTCH) (PC106E:AEP/PC107E:AEP)
3-089-179-61 MANUAL, INSTRUCTION(SWEDISH/RUSSIAN) (PC107E:NE)
3-089-179-71 MANUAL, INSTRUCTION(DANISH/FINNISH) (PC107E:NE)

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

5-2. ELECTRICAL PARTS LIST

Ref. No.	Part No.	Description			
	A-7112-555-A	CD-493 BOARD, COMPLETE			
		**********			
		(IC101 is not included in this COMPLETE board.)			
		< CAPACITOR >			
C101	1-104-851-11	TANTAL. CHIP	10uF	20%	10V
C102	1-164-850-11	CERAMIC CHIP	10PF	0.5PF	50V
C103	1-164-943-11	CERAMIC CHIP	0.01uF	10%	16V
C104	1-113-987-11	TANTAL. CHIP	4.7uF	20%	25V
		< CONNECTOR >			
CN101	1-691-352-21	CONNECTOR, FFC/FPC (ZIF) 14P			
		< IC >			
IC101	A-7112-773-A	CCD BLOCK ASSY (960HP)(CCD IMAGER)			
		(IC101 is not included in the COMPLETE board of CD-493.)			
		< COIL >			
L101	1-469-528-91	INDUCTOR	100uH		
		< TRANSISTOR >			
Q101	8-729-117-73	TRANSISTOR	2SC4178-F14		
		< RESISTOR >			
R101	1-218-959-11	RES-CHIP	3.3K	5%	1/16W

	A-7112-502-A	CR-047 BOARD, COMPLETE			
		**********			
		< CONNECTOR >			
CN801	(Note)	CONNECTOR, MULTIPLE (SOCKET)			
CN802	1-794-505-21	CONNECTOR, FPC (ZIF) 51P			
CN803	1-774-631-21	CONNECTOR, FFC/FPC 6P			
		< DIODE >			
D801	6-500-887-01	DIODE CL-191HB1-D-T			
		< RESISTOR >			
R801	1-218-954-11	RES-CHIP	1.2K	5%	1/16W
		< SWITCH >			
S801	1-771-138-82	SWITCH, KEY BOARD (EASY)			
S802	1-771-138-82	SWITCH, KEY BOARD (DISPLAY/BATT INFO)			

	A-7112-500-A	FP-840 BOARD, COMPLETE			
		**********			
		< CAPACITOR >			
C101	1-125-837-91	CERAMIC CHIP	1uF	10%	6.3V
		< CONNECTOR >			
CN101	1-794-375-21	PIN, CONNECTOR 2P			
		< DIODE >			
D102	6-500-851-01	DIODE SML-A12UTT86			
D104	8-719-988-61	DIODE 1SS355TE-17			
		< IC >			
IC101	6-600-047-01	IC RS-670			
		< RESISTOR >			
R101	1-216-813-11	METAL CHIP	220	5%	1/10W
R102	1-216-805-11	METAL CHIP	47	5%	1/10W
R104	1-216-821-11	METAL CHIP	1K	5%	1/10W
		< SWITCH >			
S101	1-771-039-31	SWITCH, PUSH (LENS SHUTTER)			

	A-7112-499-A	FP-926 BOARD, COMPLETE			
		**********			
		< SWITCH >			
S101	1-786-179-31	SWITCH, PUSH (1KEY) (PANEL REVERSE)			

	A-7112-497-A	IR-052 BOARD, COMPLETE			
		**********			
		< DIODE >			
D701	6-500-512-01	DIODE CL-330IRS-X-TU			

	A-7112-556-A	LB-096 BOARD, COMPLETE			
		**********			
		< CAPACITOR >			
C301	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C302	1-165-908-11	CERAMIC CHIP	1uF	10%	10V
C303	1-164-505-11	CERAMIC CHIP	2.2uF		16V
		< CONNECTOR >			
CN301	1-818-046-11	CONNECTOR, FFC/FPC 20P			
CN302	1-815-098-11	CONNECTOR, FPC (ZIF) 21P			
		< DIODE >			
D302	8-719-074-67	DIODE EDZ-TE61-5.6B			
D303	6-500-874-01	DIODE E1S35-AW0C7-01-A2			
		< RESISTOR >			
R302	1-216-841-11	METAL CHIP	47K	5%	1/10W
R305	1-218-989-11	RES-CHIP	1M	5%	1/16W

Be sure to read “Precautions upon replacing CCD imager” on page 4-5 when changing the CCD imager.

Note : CN801 is not supplied.

MS-201 **PD-213**

Ref. No.	Part No.	Description			
	A-7112-557-A	MS-201 BOARD, COMPLETE			
		**********			
		< BATTERY >			
⚠BT501	1-756-128-11	BATTERY, LITHIUM (SECONDARY)			
		< CONNECTOR >			
CN501	1-691-354-21	CONNECTOR, FFC/FPC (ZIF) 16P			
CN502	1-778-506-21	PIN, CONNECTOR (PC BOARD) 2P			
		< RESISTOR >			
R505	1-216-864-11	SHORT CHIP	0		
		< SWITCH >			
S501	1-771-138-82	SWITCH, KEY BOARD (RESET)			
	A-7112-498-A	PD-213 BOARD, COMPLETE			
		**********			
		< CAPACITOR >			
C602	1-164-939-11	CERAMIC CHIP	0.0022uF	10%	50V
C604	1-125-841-91	TANTAL. CHIP	22uF	20%	4V
C605	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C606	1-165-908-11	CERAMIC CHIP	1uF	10%	10V
C607	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C608	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C610	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C611	1-104-851-11	TANTAL. CHIP	10uF	20%	10V
C612	1-164-739-11	CERAMIC CHIP	560PF	5%	50V
C614	1-164-943-11	CERAMIC CHIP	0.01uF	10%	16V
C615	1-164-943-11	CERAMIC CHIP	0.01uF	10%	16V
C616	1-164-943-11	CERAMIC CHIP	0.01uF	10%	16V
C617	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C618	1-125-889-91	CERAMIC CHIP	2.2uF	10%	10V
C622	1-127-760-11	CERAMIC CHIP	4.7uF	10%	6.3V
C623	1-127-760-11	CERAMIC CHIP	4.7uF	10%	6.3V
C624	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C626	1-165-908-11	CERAMIC CHIP	1uF	10%	10V
C627	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C631	1-165-908-11	CERAMIC CHIP	1uF	10%	10V
C633	1-127-760-11	CERAMIC CHIP	4.7uF	10%	6.3V
		< CONNECTOR >			
CN601	1-793-224-11	CONNECTOR, FFC/FPC (ZIF) 22P			
CN602	1-573-915-11	CONNECTOR, FFC/FPC (ZIF) 6P			
CN603	1-573-346-21	CONNECTOR, FFC/FPC 6P			
CN605	1-573-364-11	CONNECTOR, FFC/FPC 24P			
CN606	1-794-322-11	CONNECTOR, FFC/FPC (ZIF) 6P			
		< DIODE >			
D601	8-719-073-01	DIODE MA111-(K8).S0			
D602	8-719-074-67	DIODE EDZ-TE61-5.6B			
		< FERRITE BEAD >			
FB601	1-414-760-21	BEAD, FERRITE (CHIP) (1608)			

Ref. No.	Part No.	Description			
		< IC >			
IC601	8-759-693-13	IC NJM12904V (TE2)			
IC602	8-752-109-72	IC CXM3006R			
		< COIL >			
L601	1-400-588-11	INDUCTOR, LAMINATE CHIP	10uH		
L602	1-400-588-11	INDUCTOR, LAMINATE CHIP	10uH		
L603	1-400-588-11	INDUCTOR, LAMINATE CHIP	10uH		
		< TRANSISTOR >			
Q601	8-729-427-42	TRANSISTOR	XP4211		
Q602	8-729-427-12	TRANSISTOR	XP4111		
Q603	6-550-237-01	TRANSISTOR	2SC5658T2LQ/R		
Q604	6-550-237-01	TRANSISTOR	2SC5658T2LQ/R		
Q605	6-550-237-01	TRANSISTOR	2SC5658T2LQ/R		
Q606	8-729-420-24	TRANSISTOR	2SB1218A-QRS		
Q607	8-729-420-24	TRANSISTOR	2SB1218A-QRS		
Q608	6-550-234-01	TRANSISTOR	UNR32A300LS0		
Q609	6-550-232-01	TRANSISTOR	2SA2029T2LQ/R		
Q610	6-550-232-01	TRANSISTOR	2SA2029T2LQ/R		
		< RESISTOR >			
R606	1-208-943-11	METAL CHIP	220K	0.5%	1/16W
R607	1-218-989-11	RES-CHIP	1M	5%	1/16W
R608	1-208-927-11	METAL CHIP	47K	0.5%	1/16W
R609	1-218-975-11	RES-CHIP	68K	5%	1/16W
R610	1-218-949-11	RES-CHIP	470	5%	1/16W
R611	1-218-977-11	RES-CHIP	100K	5%	1/16W
R613	1-220-206-11	RES-CHIP	91K	5%	1/16W
R614	1-208-707-11	METAL CHIP	10K	0.5%	1/16W
R615	1-218-961-11	RES-CHIP	4.7K	5%	1/16W
R616	1-218-957-11	RES-CHIP	2.2K	5%	1/16W
R617	1-218-953-11	RES-CHIP	1K	5%	1/16W
R619	1-208-647-11	METAL CHIP	33	0.5%	1/16W
R620	1-218-969-11	RES-CHIP	22K	5%	1/16W
R623	1-208-647-11	METAL CHIP	33	0.5%	1/16W
R624	1-218-973-11	RES-CHIP	47K	5%	1/16W
R625	1-218-963-11	RES-CHIP	6.8K	5%	1/16W
R627	1-218-958-11	RES-CHIP	2.7K	5%	1/16W
R633	1-218-990-11	SHORT CHIP	0		
R634	1-218-989-11	RES-CHIP	1M	5%	1/16W
R635	1-218-949-11	RES-CHIP	470	5%	1/16W
R636	1-218-953-11	RES-CHIP	1K	5%	1/16W
R637	1-218-978-11	RES-CHIP	120K	5%	1/16W
R638	1-216-864-11	SHORT CHIP	0		
R639	1-216-864-11	SHORT CHIP	0		
R640	1-218-949-11	RES-CHIP	470	5%	1/16W
R641	1-218-949-11	RES-CHIP	470	5%	1/16W
R642	1-218-973-11	RES-CHIP	47K	5%	1/16W
R643	1-218-973-11	RES-CHIP	47K	5%	1/16W
		< COMPOSITION CIRCUIT BLOCK >			
RB601	1-234-369-21	RES, NETWORK 10X4 (1005)			

CAUTION :
Danger of explosion if battery is incorrectly replaced.
Replace only with the same or equivalent type.

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description			
	A-7112-558-A	SE-140 BOARD, COMPLETE			
		**********			
		< CAPACITOR >			
C401	1-127-760-11	CERAMIC CHIP	4.7uF	10%	6.3V
C402	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C403	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C405	1-127-760-11	CERAMIC CHIP	4.7uF	10%	6.3V
C406	1-119-923-11	CERAMIC CHIP	0.047uF	10%	10V
C408	1-119-923-11	CERAMIC CHIP	0.047uF	10%	10V
C409	1-119-923-11	CERAMIC CHIP	0.047uF	10%	10V
C410	1-119-923-11	CERAMIC CHIP	0.047uF	10%	10V
C411	1-137-710-11	CERAMIC CHIP	10uF	20%	6.3V
C412	1-137-710-11	CERAMIC CHIP	10uF	20%	6.3V
C413	1-137-710-11	CERAMIC CHIP	10uF	20%	6.3V
C414	1-137-710-11	CERAMIC CHIP	10uF	20%	6.3V
C416	1-127-760-11	CERAMIC CHIP	4.7uF	10%	6.3V
C417	1-162-966-11	CERAMIC CHIP	0.0022uF	10%	50V
		< CONNECTOR >			
CN401	1-816-654-31	FFC/FPC CONNECTOR (LIF) 6P			
CN402	1-766-344-21	CONNECTOR, FFC/FPC 14P			
		< FERRITE BEAD >			
FB401	1-469-179-21	INDUCTOR, FERRITE BEAD			
FB402	1-469-179-21	INDUCTOR, FERRITE BEAD			
FB403	1-469-179-21	INDUCTOR, FERRITE BEAD			
FB404	1-469-179-21	INDUCTOR, FERRITE BEAD			
FB405	1-216-864-11	SHORT CHIP	0 (Note)		
FB406	1-216-864-11	SHORT CHIP	0 (Note)		
FB407	1-216-864-11	SHORT CHIP	0 (Note)		
		< IC >			
IC401	8-759-489-19	IC uPC6756GR-8JG-E2			
		< JACK >			
J401	1-691-737-41	JACK (SMALL TYPE) (MIC(PLUG IN POWER))			
		< COIL >			
L401	1-400-588-11	INDUCTOR, LAMINATE CHIP	10uH		
		< RESISTOR >			
R401	1-216-864-11	SHORT CHIP	0		
R402	1-218-989-11	RES-CHIP	1M	5%	1/16W
R403	1-218-965-11	RES-CHIP	10K	5%	1/16W
R404	1-218-965-11	RES-CHIP	10K	5%	1/16W
R405	1-218-989-11	RES-CHIP	1M	5%	1/16W
		< COMPOSITION CIRCUIT BLOCK >			
RB401	1-234-379-21	RES, NETWORK 22KX4 (1005)			
		< SENSOR >			
SE401	1-476-807-41	SENSOR, ANGULAR VELOCITY (PITCH)			
SE402	1-476-807-31	SENSOR, ANGULAR VELOCITY (YAW)			

Ref. No.	Part No.	Description	
		< VARISTOR >	
VDR401	1-801-862-11	VARISTOR, CHIP	(1608)
VDR402	1-801-862-11	VARISTOR, CHIP	(1608)
		VC-350 BOARD, COMPLETE	
		**********	

Electrical parts list of the VC-350 board are not shown.
Pages from 5-16 to 5-22 are not shown.

Note : Short chips are mounted to the location where FB405, FB406 and FB407 are printed.

9-876-707-31

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2004C1600-1
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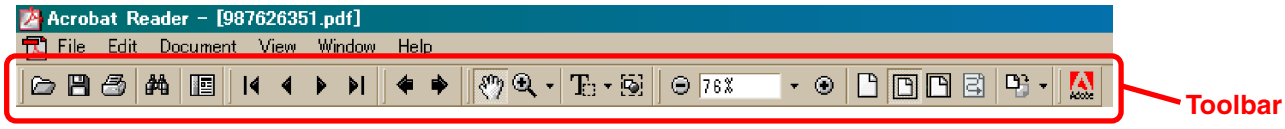
[Description of main button functions on toolbar of the Adobe Acrobat Reader Ver5.0 (for Windows)]



Printing a text

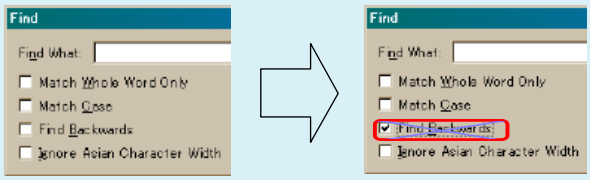
1. Click the Print button .
2. Specify a printer, print range, number of copies, and other options, and then click [OK].

Application of printing:
To set a range to be printed within a page, select the graphic selection tool and drag on the page to enclose a range to be printed, and then click the Print button.

Finding a text

1. Click the Find button .
2. Enter a character string to be found into a text box, and click the [Find]. (Specify the find options as necessary)

Application to the Service Manual:
To execute "find" from current page toward the previous pages, select the check box "Find Backward" and then click the "Find".



3. Open the find dialog box again, and click the [Find Again] and you can find the matched character strings displayed next. (Character strings entered previously are displayed as they are in the text box.)

Application to the Service Manual:
The parts on the drawing pages (block diagrams, circuit diagrams, printed circuit boards) and parts list pages in a text can be found using this find function. For example, find a Ref. No. of IC on the block diagram, and click the [Find Again] continuously, so that you can move to the Ref. No. of IC on the circuit diagram or printed circuit board diagram successively.
Note: The find function may not be applied to the Service Manual depending on the date of issue.

Switching a page

- To move to the first page, click the .
- To move to the last page, click the .
- To move to the previous page, click the .
- To move to the next page, click the .

Reversing the screens displayed once

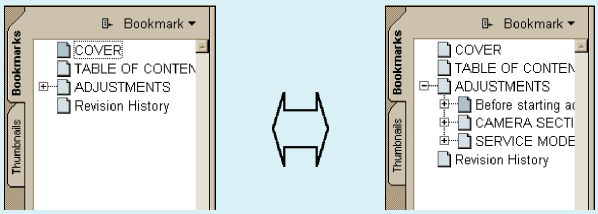
- To reverse the previous screens (operation) one by one, click the .
- To advance the reversed screens (operation) one by one, click the .

Application to the Service Manual:
This function allows you to go and back between circuit diagram and printed circuit board diagram, and accordingly it will be convenient for the voltage check.

Moving with link

1. Select either palm tool , zoom tool , text selection tool , or graphic selection tool .
2. Place the pointer in the position in a text where the link exists (such as a button on cover and the table of contents page, or blue characters on the removal flowchart page or drawing page), and the pointer will change to the forefinger form .
3. Then, click the link. (You will go to the link destination.)

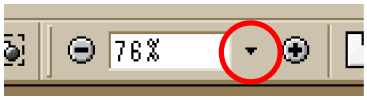
Moving with bookmark:
Click an item (text) on the bookmark pallet. and you can move to the link destination. Also, clicking can display the hidden items.
(To go back to original state, click)



Zooming or rotating the screen display

"Zoom in/out"

- Click the triangle button in the zoom control box to select the display magnification. Or, you may click or for zooming in or out.



"Rotate"

- Click rotate tool , and the page then rotates 90 degrees each.

Application to the Service Manual:
The printed circuit board diagram you see now can be changed to the same direction as the set.

Revision History

Ver.	Date	History	Contents	S.M. Rev. issued
1.0	2004.03	Official Release	—	—

DCR-PC106E/PC107E

RMT-830

Ver 1.0 2004. 03
Revision History

How to use
Acrobat Reader

SECTION 6
ADJUSTMENTS

ADJ

Link

- Before starting adjustment
  - Adjusting items when replacing main parts and boards
- CAMERA SECTION ADJUSTMENT
  - PREPARATIONS BEFORE ADJUSTMENT
  - INITIALIZATION OF 8, A, C, D, E, F, 1C, 1F PAGE DATA
  - CAMERA SYSTEM ADJUSTMENTS
  - ELECTRONIC VIEWFINDER SYSTEM ADJUSTMENT
  - LCD SYSTEM ADJUSTMENT
- MECHANISM SECTION ADJUSTMENT
  - HOW TO ENTER RECORD MODE WITHOUT CCASSETTE
  - HOW TO ENTER PLAYBACK MODE WITHOUT CCASSETTE
  - TAPE PATH ADJUSTMENT
- VIDEO SECTION ADJUSTMENT
  - PREPARATIONS BEFORE ADJUSTMENTS
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  - SERVO AND RF SYSTEM ADJUSTMENT
  - VIDEO SYSTEM ADJUSTMENTS
  - AUDIO SYSTEM ADJUSTMENTS
- SERVICE MODE
  - ADJUSTMENT REMOTE COMMANDER
  - DATA PROCESS
  - SERVICE MODE

Contents of LEVEL 2 and LEVEL 3 Service Manual

CONTENTS	LEVEL 2	LEVEL 3
1. SERVICE NOTE	○	×
2. DISASSEMBLY	○	×
3. BLOCK DIAGRAMS	OVERALL POWER	×
4. PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS	CD-493, PD-213, LB-096, SE-140, CR-047, FP-840, IR-052, MS-201, FP-926 BOARD CONTROL KEY BLOCK (SB6300) CONTROL SWITCH BLOCK (SS6800, ZM6800) FP-228, FP-467, FP-826, FP-841, FP-843, FP-847 FLEXIBLE BOARD	VC-350 BOARD
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	ELECTRICAL PARTS	○ (VC-350 BOARD)

SONY®

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* Optical axis frame is shown on page 6-56.
Color reproduction frame is shown on page 6-57.

SECTION 6
ADJUSTMENTS

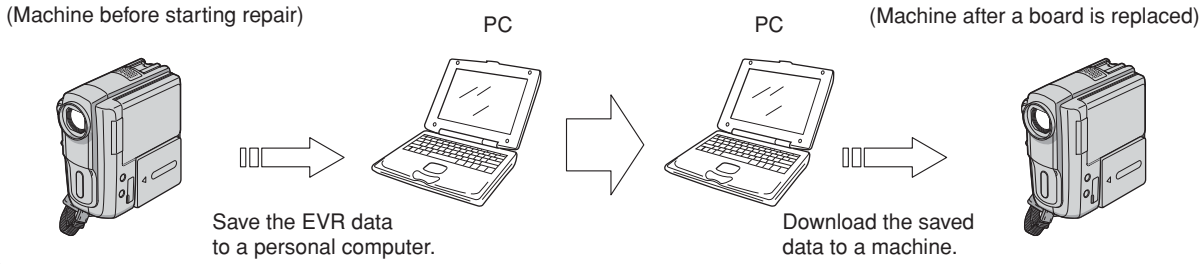
1. Before starting adjustment

EVR Data Re-writing Procedure When Replacing Board

The data that is stored in the repair board, is not necessarily correct.
Perform either procedure 1 or procedure 2 or procedure 3 when replacing board.

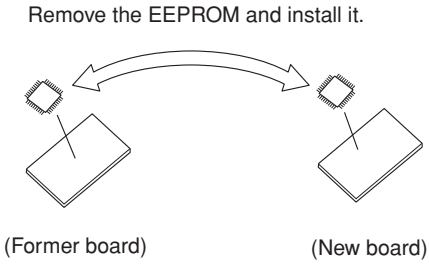
Procedure 1

Save the EVR data of the machine in which a board is going to be replaced. Download the saved data after a board is replaced.



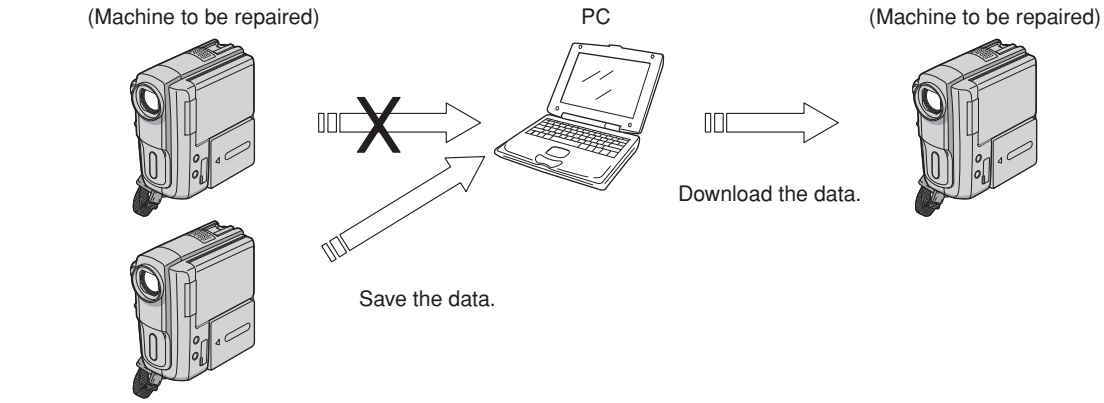
Procedure 2

Remove the EEPROM from the board of the machine that is going to be repaired. Install the removed EEPROM to the replaced board.



Procedure 3

When the data cannot be saved due to defective EEPROM, or when the EEPROM cannot be removed or installed, save the data from the same model of the same destination, and download it.



After the EVR data is saved and downloaded, check the respective items of the EVR data.
(Refer to page 6-3 for the items to be checked.)

1-1. Adjusting items when replacing main parts and boards.

• Adjusting items when replacing main parts

When replacing main parts, adjust the items indicated by ● in the following table.

Note: When replacing the drum assy. or the mechanism deck, reset the data of page: 7, address: A7 to A9 to "00". (Refer to "Record of Use check" of "6-4. SERVICE MODE")

Adjustment Section	Adjustment	Replaced parts: Block replacement: Lens device	Mechanism deck (Note)	LCD block LCD901 (LCD panel)	LCD block (backlight LED)	Mechanism deck M901 (Drum assy) (Note)	Mechanism MD block	Parts replacement: CD-493 board IC101 (CCD imager)	PD-213 board IC602 (RGB driver, Timing generator (LCD))	SE-140 board SE401/402 (PITCH /YAW sensor)	VC-350 board IC3001, X3001 (Timing generator)	VC-350 board IC3002 (S/H, A/D conv.)	VC-350 board IC6001 (Camera DV RF signal process.)	VC-350 board IC6501 (REC/PB AMP)	VC-350 board IC7001 (Video output)	VC-350 board IC9201 (EVR)	VC-350 board IC9301 (RGB driver, Timing generator (EVF))
Initialization of 8, A, C, D, E, F, 1C, 1F page data	Initialization of A, D page data																
	Initialization of 8, C, 1C page data																
	Initialization of E, F, 1F page data																
Camera	36MHz origin oscillation adj.										●					●	
	HALL adj.	●															
	Flange back adj.	●						●									
	Optical axis adj.	●						●									
	Color reproduction adj.							●				●					
	MAX GAIN adj.							●				●					
	LV standard data input							●				●					
	AWB standard data input							●				●					
	Auto white balance adj.							●				●					
	Steady shot check									●							
EVF	EVF automatic adj.												●				●
LCD	LCD automatic adj.								●				●				
	V COM adj.			●					●								
	Transmissive mode white balance adj.			●	●				●								
	Reflective mode white balance adj.			●	●				●								
Mechanism	Tape path adj.		●			●	●										
System control	Touch panel adj.			●													
	Serial No. input																
Servo, RF	CAP FG duty adj.		●				●										
	Switching position adj.		●			●	●										
	Error rate check		●			●	●						●	●			
Video	S VIDEO OUT Y level adj.												●		●		
	S VIDEO OUT chroma level adj.												●		●		

Table. 6-1-1(1).

• Adjusting items when replacing a board or EEPROM

When replacing a board or EEPROM, adjust the items indicated by ● in the following table.

Adjustment Section	Adjustment	Board replacement				EEPROM replacement	
		CD-493 board (COMPLETE)	PD-213 board (COMPLETE)	SE-140 board (COMPLETE)	VC-350 board (COMPLETE)	VC-350 board IC8602 (EEPROM)	Supporting RadarW
Initialization of 8, A, C, D, E, F, 1C, 1F page data	Initialization of A, D page data				●	●	
	Initialization of 8, C, 1C page data				●	●	
	Initialization of E, F, 1F page data				●	●	
Camera	36MHz origin oscillation adj.				●	●	
	HALL adj.				●	●	●
	Flange back adj.	●			●	●	●
	Optical axis adj.	●			●	●	
	Color reproduction adj.	●			●	●	
	MAX GAIN adj.	●			●	●	●
	LV standard data input	●			●	●	●
	AWB standard data input	●			●	●	●
	Auto white balance adj.	●			●	●	●
	Steady shot check			●	●	●	●
EVF	EVF automatic adj.				●	●	●
LCD	LCD automatic adj.		●		●	●	●
	V COM adj.		●		●	●	
	Transmissive mode white balance adj.		●		●	●	
	Reflective mode white balance adj.		●		●	●	●
Mechanism	Tape path adj.						
System control	Touch panel adj.				●	●	
	Serial No. input				●	●	
Servo, RF	CAP FG duty adj.				●	●	●
	Switching position adj.				●	●	●
	Error rate check				●	●	●
Video	S VIDEO OUT Y level adj.				●	●	
	S VIDEO OUT chroma level adj.				●	●	

Table. 6-1-1(2).

6-1. CAMERA SECTION ADJUSTMENT

1-1. PREPARATIONS BEFORE ADJUSTMENT (CAMERA SECTION)

1-1-1. List of Service Tools

• Oscilloscope • Color monitor • Vectorscope

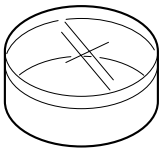
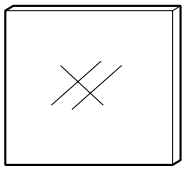
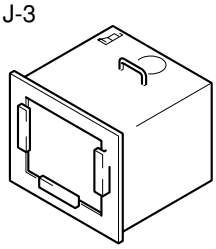
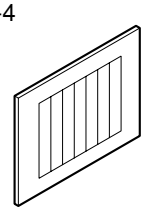
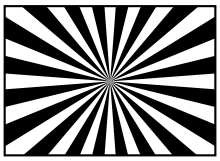
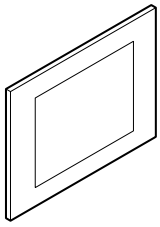
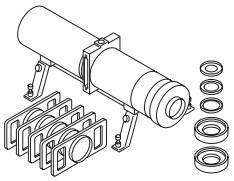
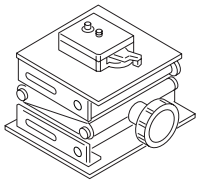
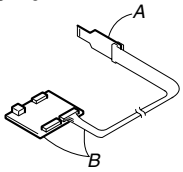
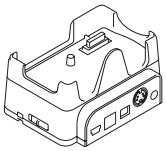
J-1  Filter for color temperature correction (C14) J-6080-058-A	J-2  ND filter 1.0 J-6080-808-A ND filter 0.4 J-6080-806-A ND filter 0.1 J-6080-807-A	J-3  Pattern box PTB-450 J-6082-200-A
J-4  Color chart for pattern box J-6020-250-A	J-5 Adjustment remote commander (RM-95 upgraded) J-6082-053-B	J-6  Siemens star chart J-6080-875-A
J-7  Clear chart for pattern box J-6080-621-A	J-8  Mini pattern box J-6082-353-B	J-9  Camera table J-6082-384-A
J-10  A: CPC-15 J-6082-564-A B: I/F unit for LANC control J-6082-521-A	J-11  Handycam station (DCRA-C112) (PC107E) 1-818-213-31 (DCRA-C113) (PC106E) 1-818-213-41	

Fig. 6-1-1.

1-1-2. Preparations

Note1: For details of how remove the cabinet and boards, refer to "2. DISASSEMBLY".

Note2: When performing only the adjustments, the lens block and boards need not be disassembled.

Note3: Before performing the adjustments, check the data of page: 0, address: 10 is "00". If not, set data: 00 to this address.

1) Connect the equipment for adjustments according to Fig. 6-1-3.

Note4: As removing the MS-201 board (removing CN1005 of the VC-350 board) means removing the lithium 3V power supply (BT501 on the MS-201 board), data such as date, time, user-set menus will be lost. After completing adjustments, reset these data.
But the self-diagnosis data and the data on history of use (total drum rotation time etc.) will be kept even if the lithium 3V power supply is removed. (Refer to "6-4.Service Mode" for the self-diagnosis data and the data on history of use.)

Note5: Setting the "Forced Camera Power ON" Mode
1) Select page: 0, address: 01, and set data: 01.
2) Select page: D, address: 10, set data: 01, and press the PAUSE button.
The above procedure will enable the camera power to be turned on with the control switch block (SS6800) removed. After completing adjustments, be sure to exit the "Forced Camera Power ON Mode". (Operate the camera functions using the touch panel. When the control key block (SS6800) is removed, the function buttons of the adjustment remote commander are not effective even if the HOLD switch of the adjustment remote commander is set to the OFF position.)

Note6: Exiting the "Forced Camera Power ON" Mode
1) Select page: 0, address: 01, and set data: 01.
2) Select page: D, address: 10, set data: 00, and press the PAUSE button.
3) Select page: 0, address: 01, and set data: 00.

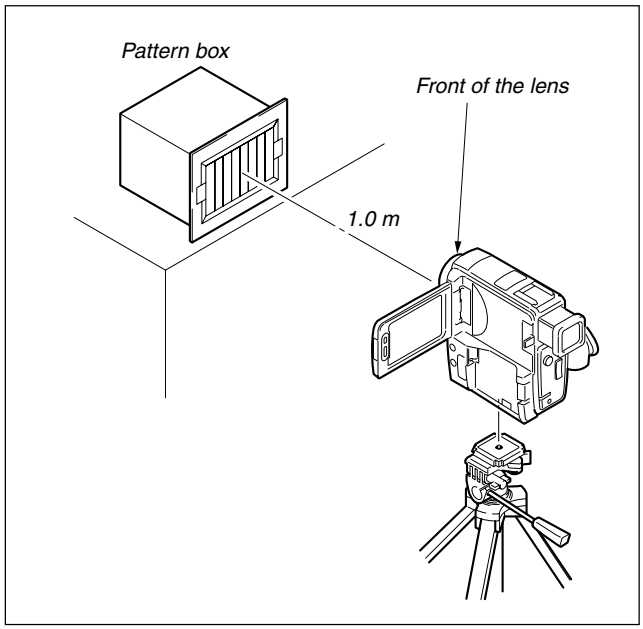


Fig. 6-1-2.

[CONNECTION OF EQUIPMENT]

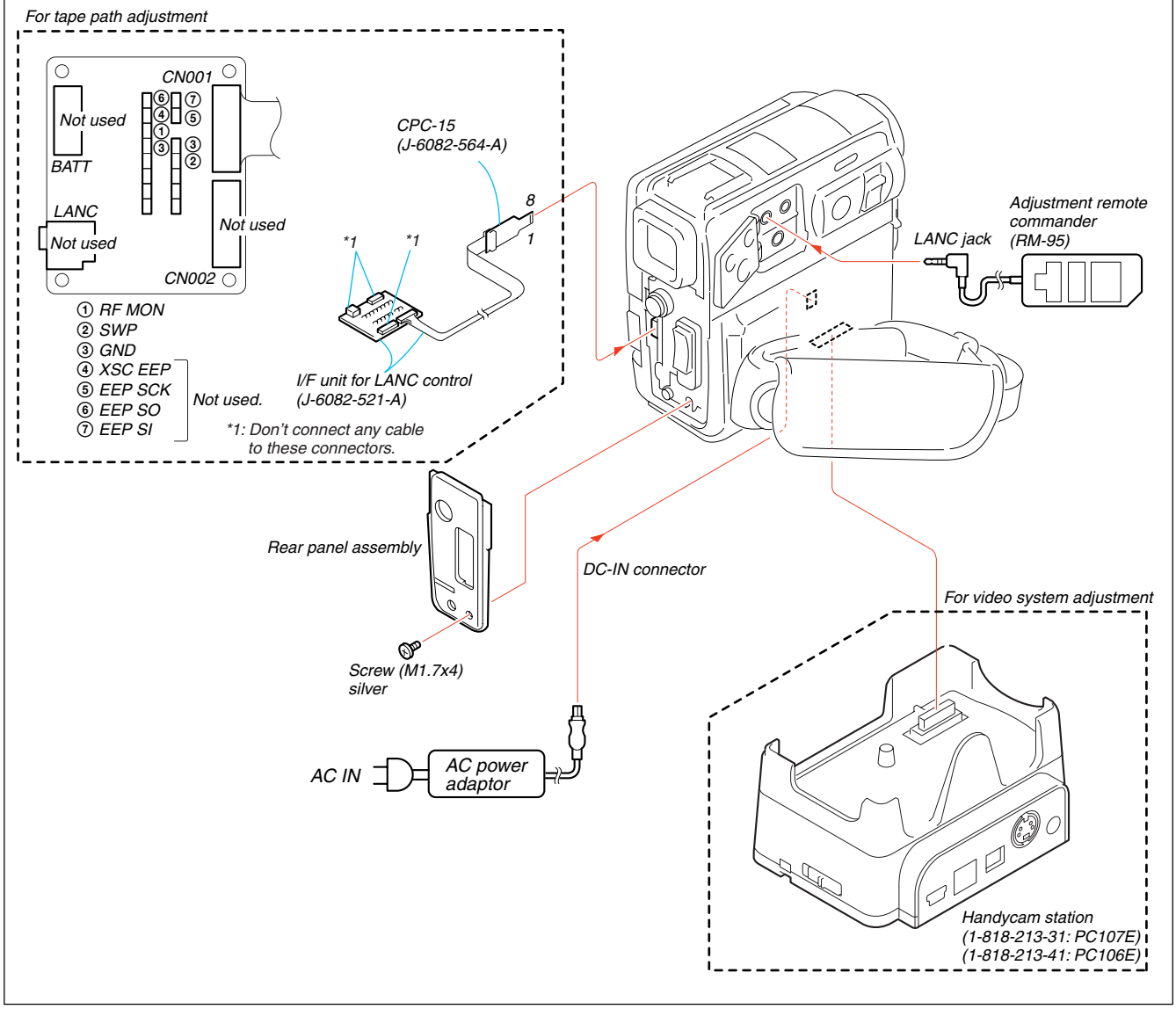


Fig. 6-1-3.

1-1-3. Precaution

1. Setting the Switch

Unless otherwise specified, set the switches as follows and perform adjustments without loading cassette.

1. MODE switch (SS6800 block) ..... CAMERA
2. NIGHT SHOT switch (Lens block) ..... OFF
3. BACK LIGHT switch (SS6800 block) ..... OFF
4. FOCUS (Touch panel) ..... MANUAL
5. EXPOSURE (Touch panel) ..... OFF
6. MENU settings (Touch panel)
   MANUAL SET menu
   PROGRAM AE ..... AUTO
   PICTURE EFECT ..... OFF
   WHITE BALANCE ..... AUTO
   CAMERA SET menu
   DIGITAL ZOOM ..... OFF
   16:9 WIDE ..... OFF
   STEADY SHOT ..... OFF
   SETUP menu
   DEMO MODE ..... OFF

2. Order of Adjustments

Basically carry out adjustments in the order given.

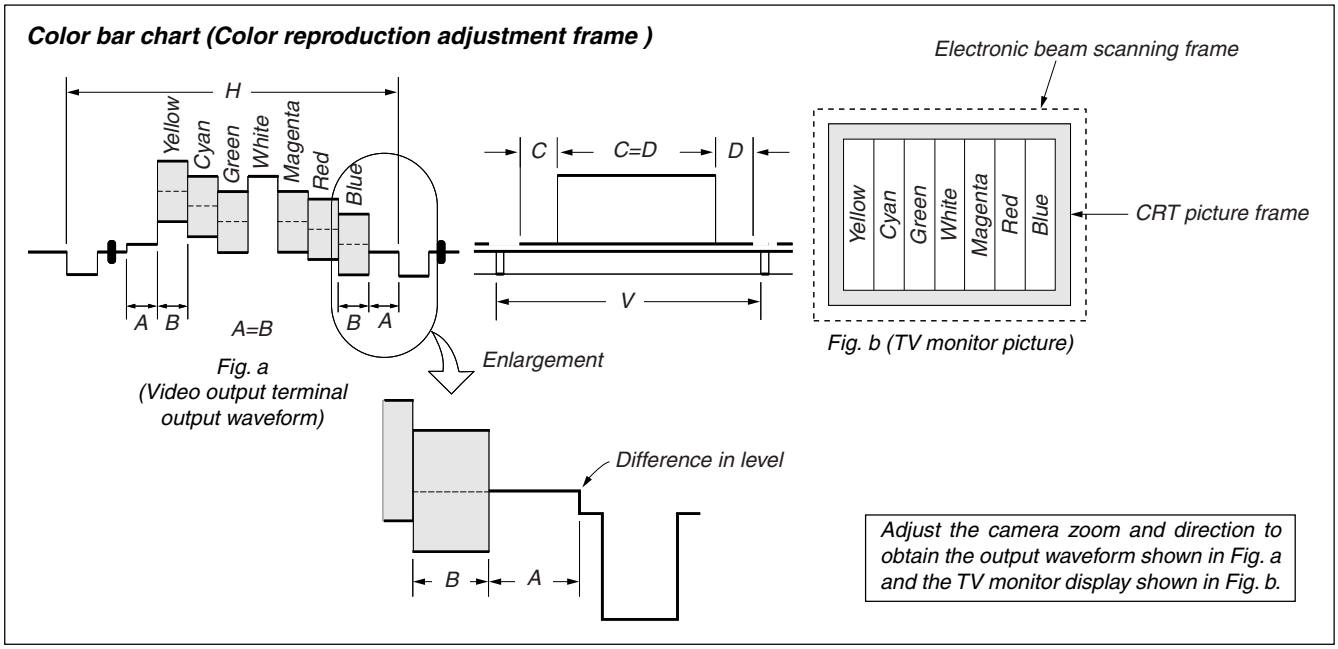


Fig.6-1-4.

3. Subjects

1) Color bar chart (Color reproduction adjustment frame)
   When performing adjustments using the color bar chart, adjust the picture frame as shown in Fig. 6-1-4. (Color reproduction adjustment frame)
2) Clear chart (Color reproduction adjustment frame)
   Remove the color bar chart from the pattern box and insert a clear chart in its place. (Do not perform zoom operations during this time.)
3) Flange back adjustment chart
   Make the chart shown in Fig. 6-1-5 using A0 size (1189mm × 841mm) black and white vellum paper.

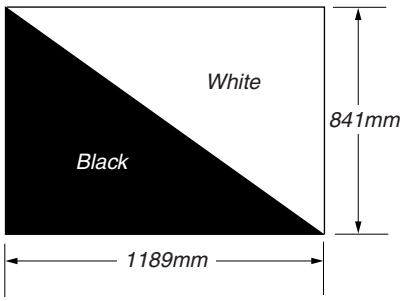


Fig. 6-1-5.

Note: Use matte vellum paper bigger than A0, and make sure the edges of the black and white paper joined together are not rough.

1-2. INITIALIZATION OF 8, A, C, D, E, F, 1C, 1F PAGE DATA

Note: When reading or writing the 1C or 1F page data, select page: 0, address: 10, and set data: 01, then select C or F page. The 1C or 1F page can be chosen by this data setting.
After reading or writing, reset the data of page: 0, address: 10 to "00".

1-2-1. INITIALIZATION OF A, D PAGE DATA

Note: The data of page: 0, address: 10 must be "00".

1. Initializing the A, D Page Data

Note1: If the A, D page data has been initialized, the following adjustments need to be performed again.
1) Modification of A, D page data
2) Touch panel adjustment

Adjusting page	A
Adjusting Address	10 to FF
Adjusting page	D
Adjusting Address	10 to 7F

Initializing Method:

Order	Page	Address	Data	Procedure
1	0	01	01	Set the data.
2	7	03	81	Set the data.
3	7	00	XX	Set the data. (Note2)
4	7	01	XX	Set the data, and press PAUSE button. (Note2)
5	7	02		Check that the data changes to "01"
6				Perform "Modification of A, D Page Data".

Note2: XX=20: Initializing A page
XX=22: Initializing D page
XX=28: Initializing A and D pages

2. Modification of A, D Page Data

If the A, D page data has been initialized, change the data of the "Fixed data-2" address shown in the following tables by manual input.

Modifying Method:

1) Before changing the data, select page: 0, address: 01, and set data: 01.
2) New data for changing are not shown in the tables because they are different in destination. When changing the data, copy the data built in the same model.
   Note: If copy the data built in the different model, the camcorder may not operate.
3) When changing the data, press the PAUSE button of the adjustment remote commander each time when setting new data to write the data in the non-volatile memory.

Processing after Completing Modification of A, D Page data

Order	Page	Address	Data	Procedure
1	2	00	29	Set the data.
2	2	01	29	Set the data, and press PAUSE button.

Note: If the following symptoms occur after completing of the "Modification of A, D page data", check that the data of addresses: 1A to 39 of A page and the data of addresses: 12 to 19 of D page are same as those of the same model of the same destination.
1) The self-diagnosis code "E:20:00" on the LCD screen is displayed.
2) The power is shut off so that unit cannot operate.

3. A Page Table

Note1: The data of page: 0, address: 10 must be “00”.

Note2: Fixed data-1: Initialized data. (Refer to “1. Initializing the A, D Page Data”.)
Fixed data-2: Modified data. (Refer to “2. Modification of A, D Page Data”).

Address	Initial value	Remark
00 to 0F		
10 to 17		Fixed data-1
18		Fixed data-2
19		(Modified data. Copy the data
1A		built in the same model.)
1B to 1F		Fixed data-1
20		Fixed data-2
21 to 31		Fixed data-1
32		Fixed data-2
33		
34 to 38		Fixed data-1
39		Fixed data-2
3A to 3F		Fixed data-1
40		Fixed data-2
41 to 43		Fixed data-1
44		Fixed data-2
45 to 49		Fixed data-1
4A		Fixed data-2
4B to 4E		Fixed data-1
50		Fixed data-2
51		(Modified data. Copy the data
52		built in the same model.)
53		
54 to 64		Fixed data-1
65		Fixed data-2
66 to 7F		Fixed data-1
80		Fixed data-2
81		
82	CC	Touch panel adj.
83	1D	
84	C4	
85	28	
86 to 8F		Fixed data-1
90		Fixed data-2
91		
92 to FF		Fixed data-1

Table. 6-1-2.

4. D Page Table

Note1: The data of page: 0, address: 10 must be “00”.

Note2: Fixed data-1: Initialized data. (Refer to “1. Initializing the A, D Page Data”.)
Fixed data-2: Modified data. (Refer to “2. Modification of A, D Page Data”).

Address	Initial value	Remark
00 to 0F		
10	00	Test mode
11		Fixed data-1
12		Fixed data-2
13 to 18		Fixed data-1
19		Fixed data-2
1A to 21		Fixed data-1
22		Fixed data-2
23		(Modified data. Copy the data
24		built in the same model.)
25		
26		
27		
28 to 29		Fixed data-1
2A		Fixed data-2
2B		
2C to 35		Fixed data-1
36		Fixed data-2
37		(Modified data. Copy the data
38		built in the same model.)
39		Fixed data-1
3A		Fixed data-2
3B to 3C		Fixed data-1
3D		Fixed data-2
3E to 55		Fixed data-1
56		Fixed data-2
57		(Modified data. Copy the data
58		built in the same model.)
59		
5A to 6E		Fixed data-1
6F		Fixed data-2
70 to 7F		Fixed data-1

Table. 6-1-3.

1-2-2. INITIALIZATION OF 8, C, 1C PAGE DATA

Note: When reading or writing the 8, C page data, select page: 0, address: 10, and set data: 00.
When reading or writing the 1C page data, select page: 0, address: 10, and set data: 01, then select C page. The 1C page can be chosen by this data setting.
After reading or writing, reset the data of page: 0, address: 10 to "00".

1. Initializing the 8, C, 1C Page Data

Note1: If "Initializing the 8, C, 1C Page Data" is performed, all data of the 8 page, C page and 1C page will be initialized. (It is impossible to initialize a single page.)

Note2: If the 8, C, 1C page data has been initialized, following adjustments need to be performed again.
1) Modification of 8, C, 1C page data
2) Viewfinder system adjustments
3) LCD system adjustments
4) Serial No. input
5) Servo and RF system adjustments
6) Video system adjustments

Adjusting page	8
Adjusting Address	00 to FF
Adjusting page	C
Adjusting Address	10 to FF
Adjusting page	1C
Adjusting Address	00 to FF

Initializing Method:

Order	Page	Address	Data	Procedure
1	0	01	01	Set the data.
2	0	10	00	Set the data.
3	3	81		Check that the data is "00".
4	3	80	0C	Set the data, and press PAUSE button.
5	3	80		Check that the data changes to "1C".
6				Perform "Modification of 8, C, 1C Page Data".

2. Modification of 8, C, 1C Page Data

If the 8, C, 1C page data has been initialized, change the data of the "Fixed data-2" address shown in the following table by manual input.

Modifying Method:

1) Before changing the data, select page: 0, address: 01, and set data: 01.
2) When changing the 8, C page data, select page: 0, address: 10, and set data: 00.
3) When changing the 1C page data, select page: 0, address: 10, and set data: 01.
   After completing the modification of 1C page data, reset the data of this address to "00".
4) New data for changing are not shown in the tables because they are different in destination. When changing the data, copy the data built in the same model.
   Note: If copy the data built in the different model, the camcorder may not operate.
5) When changing the data, press the PAUSE button of the adjustment remote commander each time when setting new data to write the data in the non-volatile memory.
6) Check that the data of adjustment addresses is the initial value. If not, change the data to the initial value.

Processing after Completing Modification of 8, C, 1C Page data

Order	Page	Address	Data	Procedure
1	0	10	00	Set the data.
2	2	00	29	Set the data.
3	2	01	29	Set the data, and press PAUSE button.

3. 8 Page Table

Note1: The data of page: 0, address: 10 must be “00”.

Note2: Fixed data-1: Initialized data. (Refer to “1. Initializing the 8, C, 1C Page Data”.)
Fixed data-2: Modified data. (Refer to “2. Modification of 8, C, 1C Page Data”).

Address	Remark
00 to 79	Fixed data-1
7A	Fixed data-2
7B to 81	Fixed data-1
82	Fixed data-2
83	(Modified data. Copy the data
84	built in the same model.)
85	
86	
87	
88	
89	
8A	
8B	
8C	
8D	
8E	
8F to 94	Fixed data-1
95	Fixed data-2
96 to AB	Fixed data-1
AC	Fixed data-2
AD to B1	Fixed data-1
B2	Fixed data-2
B3	(Modified data. Copy the data
B4	built in the same model.)
B5	Fixed data-1
B6	Fixed data-2
B7	Fixed data-1
B8	Fixed data-2
B9	(Modified data. Copy the data
BA	built in the same model.)
BB	
BC to BD	Fixed data-1
BE	Fixed data-2
BF	
C0 to C2	Fixed data-1
C3	Fixed data-2
C4	(Modified data. Copy the data
C5	built in the same model.)
C6	
C7	Fixed data-1
C8	Fixed data-2
C9	(Modified data. Copy the data
CA	built in the same model.)
CB	
CC	
CD	
CE to D6	Fixed data-1
D7	Fixed data-2
D8 to DF	Fixed data-1
E0	Fixed data-2
E1	Fixed data-1
E2	Fixed data-2
E3	(Modified data. Copy the data
E4	built in the same model.)
E5	
E6	
E7	
E8 to EF	Fixed data-1
F0	Fixed data-2
F1 to FF	Fixed data-1

Table. 6-1-4.

4. C Page Table

Note1: The data of page: 0, address: 10 must be "00".

Note2: Fixed data-1: Initialized data. (Refer to "1. Initializing the 8, C, 1C Page Data".)
Fixed data-2: Modified data. (Refer to "2. Modification of 8, C, 1C Page Data").

Address	Initial value	Remark
00 to 0F		
10	EE	Switching position adj.
11	00	
12	00	
13	00	
14 to 15		Fixed data-1
16	E0	CAP FG duty adj.
17 to 24		Fixed data-1
25	80	S VIDEO out Y level adj.
26	90	S VIDEO out Cr level adj.
27	65	S VIDEO out Cb level adj.
28 to 3B		Fixed data-1
3C		Fixed data-2
3D		(Modified data. Copy the data
3E		built in the same model.)
3F	7A	VCO adj. (EVF)
40	80	
41		Fixed data-1
42		Fixed data-2
43		Fixed data-1
44		Fixed data-2
45		(Modified data. Copy the data
46		built in the same model.)
47	29	Contrast adj. (EVF)
48 to 4B		Fixed data-1
4C		Fixed data-2
4D		(Modified data. Copy the data
4E		built in the same model.)
4F		
50	78	VCO adj. (LCD)
51	80	
52	BC	V COM adj. (LCD)
53		Fixed data-2
54		Fixed data-1
55		Fixed data-2
56	7D	Transmissive mode white balance
57	73	adj. (LCD)
58	52	Contrast adj. (LCD)
59		Fixed data-2
5A		Fixed data-1
5B		Fixed data-2
5C to 60		Fixed data-1
61		Fixed data-2
62		(Modified data. Copy the data
63		built in the same model.)
64 to 65		Fixed data-1
66		Fixed data-2
67		(Modified data. Copy the data
68		built in the same model.)
69 to 6A		Fixed data-1
6B		Fixed data-2
6C to 74		Fixed data-1
75		Fixed data-2
76 to 78		Fixed data-1
79		Fixed data-2
7A		
7B	7B	Reflective mode white balance adj.
7C	6C	(LCD)
7D		Fixed data-1
7E		Fixed data-2
7F to A3		Fixed data-1
A4		Fixed data-2
A5 to CB		Fixed data-1
CC		Fixed data-2
CD		(Modified data. Copy the data
CE		built in the same model.)
CF		
D0		
D1		
D2		
D3		
D4		
D5		
D6 to DE		Fixed data-1
DF		Fixed data-2
E0	08	Serial No. input
E1	00	
E2	46	
E3	01	
E4	02	
E5	00	
E6	00	
E7	00	
E8 to F3		Fixed data-1
F4	00	Emergency memory address
F5	00	(Mechanism section)
F6	00	
F7	00	
F8	00	
F9	00	
FA	00	
FB	00	
FC	00	
FD	00	
FE	00	
FF	00	

Table. 6-1-5.

5. 1C Page Table

Note1: When reading or writing the 1C page data, select page: 0, address: 10, and set data: 01, then select C page. The 1C page can be chosen by this data setting.
After reading or writing, reset the data of page: 0, address: 10 to "00".

Note2: Fixed data-1: Initialized data. (Refer to "1. Initializing the 8, C, 1C Page Data".)
Fixed data-2: Modified data. (Refer to "2. Modification of 8, C, 1C Page Data").

Address	Initial value	Remark
00 to B2	Fixed data-1	
B3	00	Error rate check
B4	00	
B5	00	
B6	00	
B7	00	
B8	80	
B9	00	
BA	00	
BB	00	
BC	00	
BD	00	
BE	00	
BF	00	
C0	00	
C1	00	
C2	00	
C3	80	
C4	00	
C5	00	
C6	00	
C7	00	
C8	00	
C9 to FF	Fixed data-1	

Table. 6-1-6.

1-2-3. INITIALIZATION OF E, F, 1F PAGE DATA

Note: When reading or writing the E, F page data, select page: 0, address: 10, and set data: 00.
When reading or writing the 1F page data, select page: 0, address: 10, and set data: 01, then select F page. The 1F page can be chosen by this data setting.
After reading or writing, reset the data of page: 0, address: 10 to "00".

1. Initializing the E, F, 1F Page Data

Note1: If "Initializing the E, F, 1F Page Data" is performed, all data of the E page, F page and 1F page will be initialized. (It is impossible to initialize a single page.)

Note2: If the E, F, 1F page data has been initialized, following adjustments need to be performed again.
1) Modification of E, F, 1F page data
2) Camera system adjustments

Adjusting page	E
Adjusting Address	00 to FF
Adjusting page	F
Adjusting Address	10 to FF
Adjusting page	1F
Adjusting Address	00 to FF

Initializing Method:

Order	Page	Address	Data	Procedure
1	0	01	01	Set the data.
2	0	10	00	Set the data.
3	6	01	2F	Set the data, and press PAUSE button.
4	6	03	FF	Set the data, and press PAUSE button.
5	6	02		Check that the data changes to "01".
6	6	01	00	Set the data, and press PAUSE button.
7				Perform "Modification of E, F, 1F Page Data".

2. Modification of E, F, 1F Page Data

If the E, F, 1F page data has been initialized, change the data of the "Fixed data-2" address shown in the following table by manual input.

Modifying Method:

1) Before changing the data, select page: 0, address: 01, and set data: 01.
2) When changing the E, F page data, select page: 0, address: 10, and set data: 00.
3) When changing the 1F page data, select page: 0, address: 10, and set data: 01.
   After completing the modification of 1F page data, reset the data of this address to "00".
4) New data for changing are not shown in the tables because they are different in destination. When changing the data, copy the data built in the same model.
   Note: If copy the data built in the different model, the camcorder may not operate.
5) When changing the data, press the PAUSE button of the adjustment remote commander each time when setting new data to write the data in the non-volatile memory.
6) Check that the data of adjustment addresses is the initial value. If not, change the data to the initial value.

Processing after Completing Modification of E, F, 1F Page data

Order	Page	Address	Data	Procedure
1	0	10	00	Set the data.
2	2	00	29	Set the data.
3	2	01	29	Set the data, and press PAUSE button.
4				Perform "36MHz Origin Osc. Adjustment" of the camera system adjustment.

3. E Page Table

Note1: The data of page: 0, address: 10 must be “00”.

Note2: Fixed data-1: Initialized data. (Refer to “1. Initializing the E, F, 1F Page Data”.)
Fixed data-2: Modified data. (Refer to “2. Modification of E, F, 1F Page Data”).

Address	Remark
00 to 14	Fixed data-1
15	Fixed data-2
16 to 1B	Fixed data-1
1C	Fixed data-2
1D	
1E to 34	Fixed data-1
35	Fixed data-2
36 to 3B	Fixed data-1
3C	Fixed data-2
3D to 42	Fixed data-1
43	Fixed data-2
44	(Modified data. Copy the data
45	built in the same model.)
46	
47	
48	
49	
4A	
4B	
4C	
4D to 86	Fixed data-1
87	Fixed data-2
88	(Modified data. Copy the data
89	built in the same model.)
8A	
8B	
8C	
8D	
8E	Fixed data-1
8F	Fixed data-2
90	(Modified data. Copy the data
91	built in the same model.)
92 to C3	Fixed data-1
C4	Fixed data-2
C5 to FF	Fixed data-1

Table. 6-1-7.

4. F Page Table

Note1: The data of page: 0, address: 10 must be “00”.

Note2: Fixed data-1: Initialized data. (Refer to “1. Initializing the E, F, 1F Page Data”.)
Fixed data-2: Modified data. (Refer to “2. Modification of E, F, 1F Page Data”).

Address	Initial value	Remark
00 to 0F		
10	80	36MHz origin osc. adj.
11		Fixed data-1
12	45	HALL adj.
13	43	
14	11	
15	20	
16	02	
17	E0	
18		Fixed data-1
19	A8	MAX GAIN adj.
1A	00	LV standard data input
1B	60	
1C to 29		Fixed data-1
2A	1B	AWB standard data input
2B	00	
2C	07	
2D	00	
2E	0E	Auto white balance adj.
2F	00	
30	0D	
31	00	
32		Fixed data-1
33	22	Color reproduction adj.
34		Fixed data-1
35	24	Color reproduction adj.
36 to 39		Fixed data-1
3A	00	Color reproduction adj.
3B	EF	
3C to 3D		Fixed data-1
3E	2C	Auto white balance adj.
3F	40	
40	59	
41	30	
42 to 43		Fixed data-1
44	1F	Flange back adj.
45	F6	
46	27	
47	DD	
48	14	
49	4B	
4A	00	
4B	00	
4C	00	
4D	00	
4E	22	
4F	19	
50	00	
51	75	

F page

Address	Initial value	Remark
52	04	Flange back adj.
53	00	
54	00	
56 to 59		Fixed data-1
5A	FF	Optical axis adj.
5B to 8B		Fixed data-1
8C		Fixed data-2 (Modified data. Copy the data built in the same model.)
8D		
8E		
8F		
90		
91 to 92		Fixed data-1
93		Fixed data-2 (Modified data. Copy the data built in the same model.)
94		
95		
96		
97		
98		Fixed data-1
99		Fixed data-2
9A		
9B		Fixed data-1
9C		Fixed data-2
9D to 9F		Fixed data-1
A0		Fixed data-2 (Modified data. Copy the data built in the same model.)
A1		
A2		
A3		Fixed data-1
A4		Fixed data-2
A5		Fixed data-1
A6		Fixed data-2
A7 to A8		Fixed data-1
A9		Fixed data-2 (Modified data. Copy the data built in the same model.)
AA		
AB		
AC		
AD		
AE		
AF		
B0		
B1 to CB		Fixed data-1
CC		Fixed data-2 (Modified data. Copy the data built in the same model.)
CD		
CE		
CF		
D0		
D1		
D2		
D3 to EA		Fixed data-1
EB		Fixed data-2
EC to ED		Fixed data-1
EE		Fixed data-2
EF to F1		Fixed data-1
F2		Fixed data-2
F3		
F4 to F8		Fixed data-1
F9		Fixed data-2
FA to FB		Fixed data-1
FC		Fixed data-2
FD to FF		Fixed data-1

Table. 6-1-9.

5. 1F Page Table

Note1: When reading or writing the 1F page data, select page: 0, address: 10, and set data: 01, then select F page. The 1F page can be chosen by this data setting.
After reading or writing, reset the data of page: 0, address: 10 to "00".

Note2: Fixed data-1: Initialized data. (Refer to "1. Initializing the E, F, 1F Page Data".)
Fixed data-2: Modified data. (Refer to "2. Modification of E, F, 1F Page Data").

Address	Initial value	Remark
00 to 59		Fixed data-1
5A	00	Emergency memory address (Camera section)
5B	00	
5C	00	
5D	00	
A9 to FF		Fixed data-1

Table. 6-1-9.

1-3. CAMERA SYSTEM ADJUSTMENTS

Before perform the camera system adjustments (except for "36MHz Origin Oscillation Adjustment"), check that the specified values of "VIDEO SYSTEM ADJUSTMENTS" are satisfied.
And check that the data of page: 0, address: 10 is "00". If not, set data: 00 to this address.

1. 36MHz Origin Oscillation Adjustment (VC-350 board)

Set the frequency of the clock for synchronization.
If deviated, the synchronization will be disrupted and the color will become inconsistent.

Subject	Not required
Measurement Point	Pin ⑫ of IC3001
Measuring Instrument	Frequency counter
Adjustment Page	F
Adjustment Address	10
Specified Value	f=18000000 ± 90Hz

Note: The data of page: 0, address: 10 must be "00".

Adjusting method:

Order	Page	Address	Data	Procedure
1	0	01	01	Set the data.
2	F	10		Change the data and set the frequency (f) to the specified value.
3	F	10		Press PAUSE button.
4	0	01	00	Set the data.

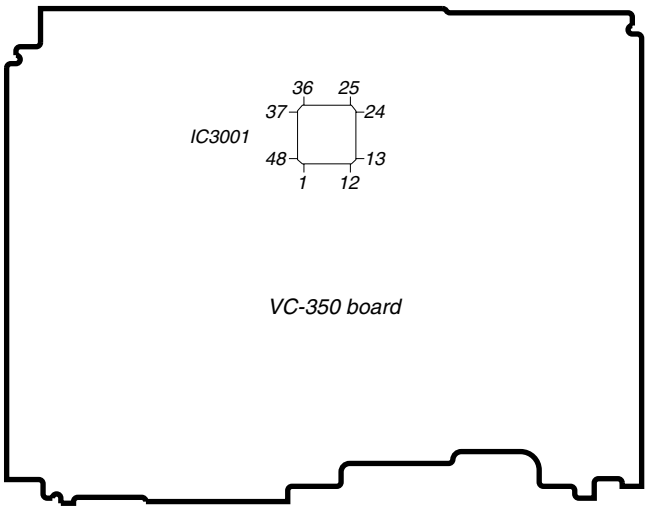


Fig. 6-1-6.

2. HALL Adjustment RadarW

For detecting the position of the lens iris and ND filter, adjust AMP gain and offset.

Subject	Not required
Measurement Point	Display data of page 1 (Note1)
Measuring Instrument	Adjustment remote commander
Adjustment Page	F
Adjustment Address	12 to 17
Specified Value 1	85 to 89
Specified Value 2	15 to 19

Note1: Displayed data of page 1 of the adjustment remote commander.
1 : 00 : XX
└── IRIS display data
Note2: The data of page: 0, address: 10 must be "00".
Note3: Check that the data of page: 6, address: 02 is "00". If not, to page: 6, address: 01, set data: 00, and press the PAUSE button.

Adjusting method:

Order	Page	Address	Data	Procedure
1	0	01	01	Set the data.
2	6	94	87	Set the data.
3	6	95	17	Set the data.
4	6	01	6D	Set the data, and press PAUSE button.
5	6	02		Check that the data changes to "01". (Note4)
6	6	01	00	Set the data, and press PAUSE button.

Note4: The adjustment data will be automatically input to page: F, address: 12 to 17.

Checking method:

Order	Page	Address	Data	Procedure
1	0	03	03	Set the data.
2	6	01	01	Set the data, and press PAUSE button.
3	1			Check that the IRIS display data (Note1) satisfies the specified value 1.
4	6	01	03	Set the data, and press PAUSE button.
5	1			Check that the IRIS display data (Note1) satisfies the specified value 2.

Processing after Completing Adjustments:

Order	Page	Address	Data	Procedure
1	6	94	00	Set the data.
2	6	95	00	Set the data.
3	6	01	00	Set the data, and press PAUSE button.
4	0	03	00	Set the data.
5	0	01	00	Set the data.

3. Flange Back Adjustment (Using Minipattern Box) RadarW

The inner focus lens flange back adjustment is carried out automatically. In whichever case, the focus will be deviated during auto focusing/manual focusing.

Subject	Siemens star chart with ND filter for the minipattern box (Note1)
Measuring Instrument	Adjustment remote commander
Adjustment Page	F
Adjustment Address	44 to 54

Note1: Dark Siemens star chart.
Note2: This adjustment should be carried out upon completion of "HALL Adjustment".
Note3: Make the lens horizontal and perform this adjustment.
Note4: The data of page: 0, address: 10 must be "00".
Note5: Check that the data of page: 6, address: 02 is "00". If not, turn off the power and turn on again.

Switch setting:

1) MODE ..... CAMERA
2) NIGHT SHOT ..... OFF

Preparations:

1) The minipattern box is installed as shown in the following figure.
   Note: The attachment lenses are not used.
2) Install the minipattern box so that the distance between it and the front of the lens of the camcorder is less than 3cm.
3) Make the height of the minipattern box and the camcorder equal.
4) Check that the output voltage of the regulated power supply is the specified voltage.
5) Check that at both the zoom lens TELE end and WIDE end, the center of the Siemens star chart and center of the exposure screen coincide.

Specified voltage:

The specified voltage varies according to the minipattern box, so adjust the power supply output voltage to the specified voltage written on the sheet which is supplied with the minipattern box.

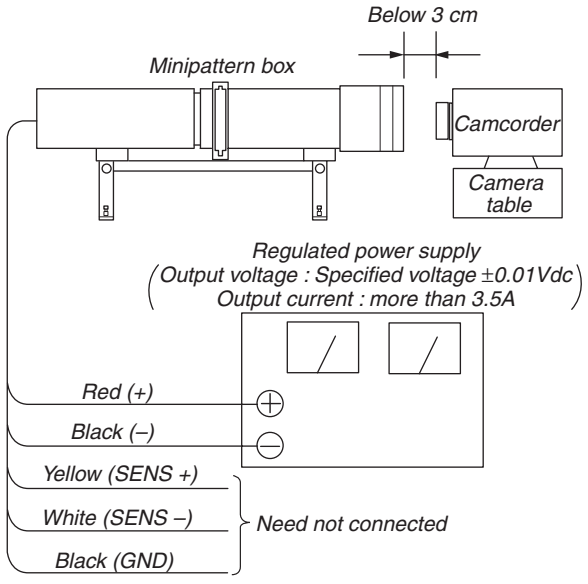


Fig. 6-1-7.

Adjusting method:

Order	Page	Address	Data	Procedure
1	0	01	01	Set the data.
2	6	48	01	Set the data.
3	6	01	13	Set the data, and press PAUSE button. (Note3)
4	6	01	27	Set the data, and press PAUSE button.
5	6	02		Check that the data changes to "01". (Note6)

Note6: The adjustment data will be automatically input to page: F, address: 44 to 54.

Processing after Completing Adjustments:

Order	Page	Address	Data	Procedure
1	6	48	00	Set the data.
2	6	01	00	Set the data, and press PAUSE button.
3	6	01	25	Set the data, and press PAUSE button.
4	6	01	00	Set the data, and press PAUSE button.
5	0	01	00	Set the data.
6				Perform "Flange Back Check".

4. Flange Back Adjustment (Using Flange Back Adjustment Chart and Subject More Than 500m Away)

The inner focus lens flange back adjustment is carried out automatically. In whichever case, the focus will be deviated during auto focusing/manual focusing.

4-1. Flange Back Adjustment (1) RadarW

Subject	Flange back adjustment chart (2.0 m from the front of the protection glass) (Luminance: 350 ± 50 lux)
Measuring Instrument	Adjustment remote commander
Adjustment Page	F
Adjustment Address	44 to 54

Note1: This adjustment should be carried out upon completion of "HALL Adjustment".
Note2: Make the lens horizontal and perform this adjustment.
Note3: The data of page: 0, address: 10 must be "00".
Note4: Check that the data of page: 6, address: 02 is "00". If not, turn off the power and turn on again.

Switch setting:

1) MODE ..... CAMERA
2) NIGHT SHOT ..... OFF

Preparations:

1) Check that at both the zoom lens TELE end and WIDE end, the center of the chart for the flange back adjustment and center of the exposure screen coincide.

Adjusting method:

Order	Page	Address	Data	Procedure
1	0	01	01	Set the data.
2	6	48	01	Set the data.
3	6	01	13	Set the data, and press PAUSE button. (Note2)
4	6	01	15	Set the data, and press PAUSE button.
5	6	02		Check that the data changes to "01". (Note5)

Note5: The adjustment data will be automatically input to page: F, address: 44 to 54.

Processing after Completing Adjustments:

Order	Page	Address	Data	Procedure
1	6	01	00	Set the data, and press PAUSE button.
2	6	01	25	Set the data, and press PAUSE button.
3	6	01	00	Set the data, and press PAUSE button.
4				Perform "Flange Back Adjustment (2)".

4-2. Flange Back Adjustment (2) RadarW

Perform this adjustment after performing "Flange Back Adjustment (1)".

Subject	Subject more than 500m away (Subjects with clear contrast such as buildings, etc.)
Measurement Point	Check operation on TV monitor
Measuring Instrument	
Adjustment Page	F
Adjustment Address	44 to 54

Note1: Make the lens horizontal and perform this adjustment.
Note2: The data of page: 0, address: 10 must be "00".
Note3: Check that the data of page: 6, address: 02 is "00". If not, turn off the power and turn on again.

Switch setting:

1) MODE ..... CAMERA
2) NIGHT SHOT ..... OFF

Preparations:

1) Set the zoom lens to the TELE end and expose a subject that is more than 500m away (subject with clear contrast such as building, etc.). (Nearby subjects less than 500m away should not be in the screen.)

Adjusting method:

Order	Page	Address	Data	Procedure
1	0	01	01	Set the data.
2	6	48	01	Set the data.
3	6	01	13	Set the data, and press PAUSE button. (Note2)
4				Place a ND filter on the lens so that the optimum image is obtain.
5	6	01	29	Set the data, and press PAUSE button.
6	6	02		Check that the data changes to "01". (Note4)

Note4: The adjustment data will be automatically input to page: F, address: 44 to 54.

Processing after Completing Adjustments:

Order	Page	Address	Data	Procedure
1	6	48	00	Set the data.
2	6	01	00	Set the data, and press PAUSE button.
3	6	01	25	Set the data, and press PAUSE button.
4	6	01	00	Set the data, and press PAUSE button.
5	0	01	00	Set the data.
6				Perform "Flange Back Check".

5. Flange Back Check

Subject	Siemens star (2.0m from the front of the lens) (Luminance : approx. 200 lux)
Measurement Point	Check operation on TV monitor
Measuring Instrument	
Specified Value	Focused at the TELE end and WIDE end.

Note1: The data of page: 0, address: 10 must be "00".

Switch setting:

1) MODE ..... CAMERA
2) NIGHT SHOT ..... OFF

Note2: When the auto focus is ON, the lens can be checked if it is focused or not by observing the data on the page 1 of the adjustment remote commander.

1) Select page: 0, address: 03, and set data: 0F.
2) Page 1 shows the state of the focus.

1 : 00 : XX
- Odd: Focused
- Even: Unfocused

Checking method:

1) Select page: 6, address: 40, and set data: 01.
2) Select page: 6, address: 41, and set data: 01.
3) Place the Siemens star 2.0m from the front of the lens.
4) To open the IRIS, decrease the luminous intensity to the Siemens star up to a point before noise appear on the image.
5) Shoot the Siemens star with the zoom TELE end.
6) Turn on the auto focus.
7) Check that the lens is focused (Note2).
8) Select page: 6, address: 21, and set data: 10.
9) Shoot the Siemens star with the zoom WIDE end.
10) Observe the TV monitor and check that the lens is focused.

Processing after Completing Adjustments:

1) Select page: 6, address: 21, and set data: 00.
2) Select page: 6, address: 40, and set data: 00.
3) Select page: 6, address: 41, and set data: 00.
4) Select page: 0, address: 03, and set data: 00.

6. Optical Axis Adjustment

Align the lens Optical Axis with that of the CCD imager. If deviated, center of picture can lose focus when zoom is operated from the WIDE end to the TELE end.

Subject	Siemens star
Measurement Point	Check on the monitor TV
Measuring Instrument	
Adjustment Page	F
Adjustment Address	5A

Note1: This adjustment should be carried out upon completion of "Flange back adjustment".
Note2: The data of page: 0, address: 10 must be "00".
Note3: Check that the data of page: 6, address: 48 is "00". If not, set data: 00 to this address.

Switch setting:

1) MODE ..... CAMERA
2) DIGITAL ZOOM (Menu setting) ..... OFF
3) STEADY SHOT (Menu setting) ..... OFF

Preparations before adjustments:

1) Playback the monoscope segment of the system check tape (XH5-5P).
2) Attach the optical axis frame chart (transparent) on the monitor TV screen. Center of monoscope image and that of optical axis frame must be agree.
3) Set to CAMERA mode.

Adjusting method:

1) Select page: 0, address: 01, and set data: 01.
2) Select page: F, address: 5A, set data: 00, and press the PAUSE button.
3) Place the Siemens star 2.0 m away from the front of the lens.
4) Shoot the Siemens star with the zoom TELE end.
5) Point the lens toward the Siemens star chart until center of the Siemens star is located in the center of the optical axis frame.
6) Shoot the Siemens star with the zoom WIDE end.
7) Measure on the monitor TV screen in which area of the optical axis frame the center of the Siemens star is located. Measure the amount of displacement (distance between the center of the Siemens star and the center of the optical axis frame.) The measurement value is named L1.
8) Read the correction data corresponding to the area from Table 6-1-8.
9) Input the correction data to page: F, address: 5A, and press the PAUSE button
10) Shoot the Siemens star with the zoom TELE end.
11) Point the lens toward the Siemens star chart until center of the Siemens star is located in the center of the optical axis frame.
12) Shoot the Siemens star with the zoom WIDE end.
13) Measure the amount of displacement (distance between the center of the Siemens star and the center of the optical axis frame.) The measurement value is named L2.
14) Compare the values L1 and L2, and confirm that L2 is smaller than L1. If L2 is lager than L1, select page: F, address: 5A, set data: 00, and press the PAUSE button.

Area	Display phase	Correction data (Page: F, address: 5A)
1	22.6° to 67.5°	01
2	67.6° to 112.5°	02
3	112.6° to 157.5°	03
4	157.6° to 202.5°	04
5	202.6°to 247.5°	05
6	247.6° to 292.5°	06
7	292.6° to 337.5°	07
8	337.6° to 22.5°	08

Table 6-1-10.

Processing after Completing Adjustments:

1) Select page: 0, address: 01, and set data: 00.

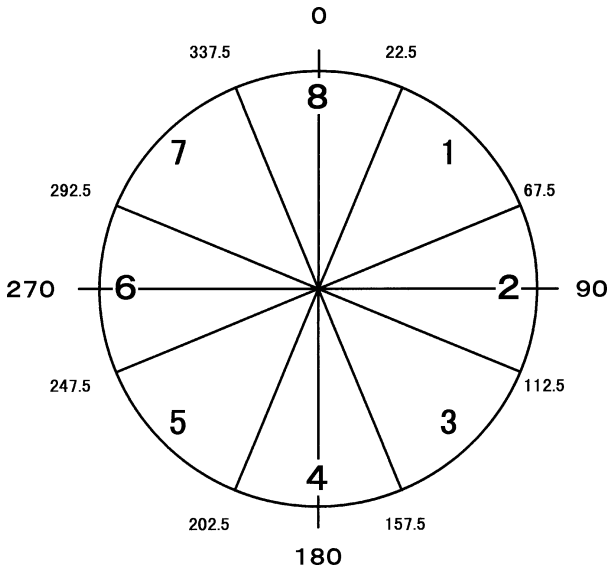


Fig. 6-1-8.

7. Picture Frame Setting

Subject	Color bar chart (Color reproduction adjustment frame) (1.0m from the front of the lens)
Measurement Point	Video terminal of AUDIO/VIDEO jack
Measuring Instrument	Oscilloscope and TV monitor
Specified Value	A=B, C=D, E=F

Note1: The following adjustments should be carried out upon completion of "Flange back adjustment" and "Optical Axis Adjustment".
Note2: The data of page: 0, address: 10 must be "00".

Switch setting:

1) MODE ..... CAMERA
2) NIGHT SHOT ..... OFF
3) DIGITAL ZOOM (Menu setting) ..... OFF
4) STEADY SHOT (Menu setting) ..... OFF

Setting method:

1) Select page: 6, address: 48, and set data: 02.
2) Adjust the zoom and the camera direction, and set to the specified position.
3) Mark the position of the picture frame on the monitor display, and adjust the picture frame to this position in following adjustments using "Color reproduction adjustment frame".

Processing after Completing Camera System Adjustments:

After completing the camera system adjustments, release the data settings.

1) Select page: 6, address: 48, and set data: 00.

Check on the oscilloscope

1. Horizontal period

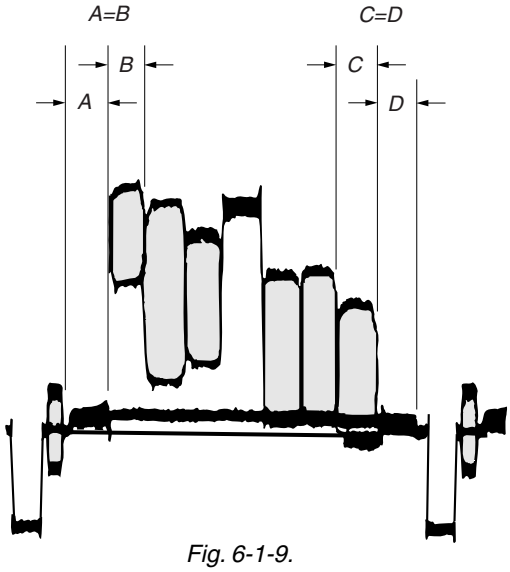


Fig. 6-1-9.

2. Vertical period

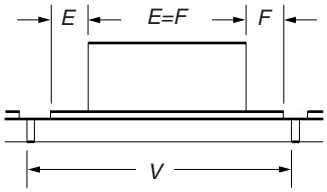


Fig. 6-1-10.

Check on the monitor TV (Underscanned mode)

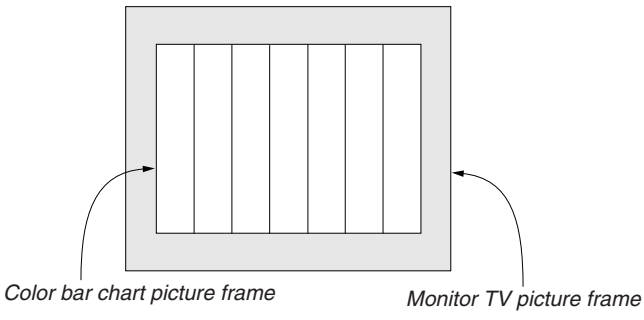


Fig. 6-1-11.

8. Color Reproduction Adjustment

Adjust the color Separation matrix coefficient so that proper color reproduction is produced.

Subject	Color bar chart (Color reproduction adjustment frame)
Measurement Point	Video terminal of AUDIO/VIDEO jack
Measuring Instrument	Vectorscope
Adjustment Page	F
Adjustment Address	33, 35, 3A, 3B
Specified Value	All color luminance points should settle within each color reproduction frame.

Note1: This adjustment should be carried out upon completion of "Flange back adjustment" and "Optical Axis Adjustment".
Note2: The data of page: 0, address: 10 must be "00".

Switch setting:

1) MODE ..... CAMERA
2) NIGHT SHOT ..... OFF
3) DIGITAL ZOOM (Menu setting) ..... OFF
4) STEADY SHOT (Menu setting) ..... OFF

Adjusting method:

1) Select page: 0, address: 01, and set data: 01.
2) Select page: 6, address: 48, and set data: 02.
3) Select page: 6, address: 9D, set data: 82, and press the PAUSE button.
4) Select page: 6, address: 01, set data: 3D, and press the PAUSE button.
5) Select page: F, address: 80, set data: B7, and press the PAUSE button.
6) Adjust the GAIN and PHASE of the vectorscope, and adjust the burst luminance point to the burst position of the color reproduction frame.
7) Change the data of page: F, address: 33, 35, 3A and 3B, and settle each color luminance point in each color reproduction frame.

   Note: Be sure to press the PAUSE button of the adjustment remote commander before changing the addresses. If not, the new data will not be written to the memory.

Processing after Completing Adjustments:

1) Select page: 6, address: 01, set data: 00, and press the PAUSE button.
2) Select page: 6, address: 48, and set data: 00.
3) Select page: 6, address: 9D, and set data: 00.
4) Select page: 0, address: 01, and set data: 00.

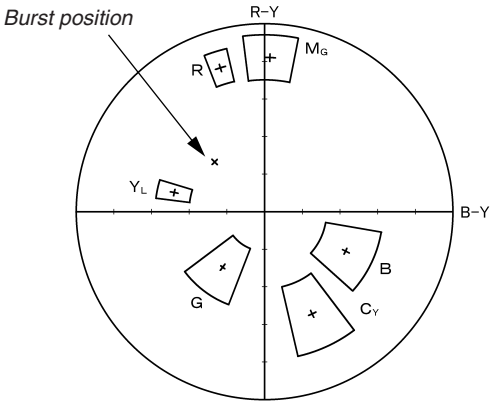


Fig. 6-1-12.

9. MAX GAIN Adjustment RadarW

Setting the minimum illumination.
If it is not consistent, the image level required for taking subjects in low illuminance will not be produced (dark).

Subject	Clear chart (Color reproduction adjustment frame)
Adjustment Page	F
Adjustment Address	19

Note1: This adjustment should be carried out upon completion of "Flange back adjustment" and "Optical Axis Adjustment".
Note2: The data of page: 0, address: 10 must be "00".
Note3: Check that the data of page: 6, address: 02 is "00". If not, to page: 6, address: 01, set data: 00, and press the PAUSE button.

Switch setting:

1) MODE ..... CAMERA
2) NIGHT SHOT ..... OFF
3) DIGITAL ZOOM (Menu setting) ..... OFF
4) STEADY SHOT (Menu setting) ..... OFF

Adjusting method:

Order	Page	Address	Data	Procedure
1	0	01	01	Set the data.
2	6	48	02	Set the data.
3	6	96	15	Set the data.
4	6	97	00	Set the data.
5	6	01	6F	Set the data, and press PAUSE button.
6	6	02		Check that the data changes to "01". (Note5)

Note5: The adjustment data will be automatically input to page: F, address: 19.

Processing after Completing Adjustments

Order	Page	Address	Data	Procedure
1	6	48	00	Set the data.
2	6	96	00	Set the data.
3	6	97	00	Set the data.
4	6	01	00	Set the data, and press PAUSE button.
5	0	01	00	Set the data.

10. LV Standard Data Input RadarW

And adjust the normal coefficient of the light value.

Subject	Clear chart (Color reproduction adjustment frame)
Measurement Point	Display data of page 1 (Note4)
Measuring Instrument	Adjustment remote commander
Adjustment Page	F
Adjustment Address	1A, 1B
Specified Value	0FB0 to 1050

Note1: This adjustment should be carried out upon completion of "Flange back adjustment", "Optical Axis Adjustment".
Note2: The data of page: 0, address: 10 must be "00".
Note3: Check that the data of page: 6, address: 02 is "00". If not, to page: 6, address: 01, set data: 00, and press the PAUSE button.
Note4: Displayed data of page 1 of the adjustment remote commander.
1 : XX : XX
Display data

Switch setting:

1) MODE ..... CAMERA
2) NIGHT SHOT ..... OFF
3) DIGITAL ZOOM (Menu setting) ..... OFF
4) STEADY SHOT (Menu setting) ..... OFF

Adjusting method:

Order	Page	Address	Data	Procedure
1	0	01	01	Set the data.
2	6	48	02	Set the data.
3	6	01	0D	Set the data, and press PAUSE button.
4	6	02		Check that the data changes to "01". (Note5)
5	0	03	1E	Set the data.
6	1			Check that the display data (Note5) satisfies the specified value.

Note5: The adjustment data will be automatically input to page: F, address: 1A, 1B.

Processing after Completing Adjustments

Order	Page	Address	Data	Procedure
1	6	01	00	Set the data, and press PAUSE button.
2	6	48	00	Set the data.
3	0	03	00	Set the data.
4	0	01	00	Set the data.
5				Perform "Auto White Balance Standard Data Input".

11. Auto White Balance Standard Data Input RadarW

Adjust the white balance reference at 3200K.

Subject	Clear chart (Color reproduction adjustment frame)
Adjustment Page	F
Adjustment Address	2A to 2D

Note1: This adjustment should be carried out upon completion of "Flange back adjustment", "Optical Axis Adjustment" and "Color reproduction adjustment".
Note2: The data of page: 0, address: 10 must be "00".
Note3: Check that the data of page: 6, address: 02 is "00". If not, to page: 6, address: 01, set data: 00, and press the PAUSE button.

Switch setting:

1) MODE ..... CAMERA
2) NIGHT SHOT ..... OFF
3) DIGITAL ZOOM (Menu setting) ..... OFF
4) STEADY SHOT (Menu setting) ..... OFF

Adjusting method:

Order	Page	Address	Data	Procedure
1	0	01	01	Set the data.
2	6	48	02	Set the data.
3				Wait for 2 sec.
4	6	01	11	Set the data, and press PAUSE button.
5	6	01	0B	Set the data, and press PAUSE button.
6	6	02		Check that the data changes to "01". (Note4)

Note4: The adjustment data will be automatically input to page: F, address: 2A to 2D.

Processing after Completing Adjustments

Order	Page	Address	Data	Procedure
1	6	01	00	Set the data, and press PAUSE button.
2	6	48	00	Set the data.
3	0	01	00	Set the data.
4				Perform "Auto White Balance Adjustment".

12. Auto White Balance Adjustment RadarW

Adjust to the proper auto white balance output data.
If it is not correct, auto white balance and color reproducibility will be poor.

Subject	Clear chart (Color reproduction adjustment frame)
Filter	Filter C14 for color temperature correction
Adjustment Page	F
Adjustment Address	2E to 31, 3E to 41

Note1: This adjustment should be carried out upon completion of "Auto White Balance Standard Data Input".
Note2: The data of page: 0, address: 10 must be "00".
Note3: Check that the data of page: 6, address: 02 is "00". If not, to page: 6, address: 01, set data: 00, and press the PAUSE button.

Switch setting:

1) MODE ..... CAMERA
2) NIGHT SHOT ..... OFF
3) DIGITAL ZOOM (Menu setting) ..... OFF
4) STEADY SHOT (Menu setting) ..... OFF

Adjusting method:

Order	Page	Address	Data	Procedure
1				Place the C14 filter for color temperature correction on the lens.
2	0	01	01	Set the data.
3	6	48	02	Set the data.
4	F	3E	2A	Set the data, and press PAUSE button.
5	F	3F	C0	Set the data, and press PAUSE button.
6	F	40	5C	Set the data, and press PAUSE button.
7	F	41	00	Set the data, and press PAUSE button.
8	6	01	83	Set the data, and press PAUSE button.
9	6	01	81	Set the data, and press PAUSE button.
10	6	02		Check that the data changes to "01". (Note4)

Note4: The adjustment data will be automatically input to page: F, address: 2E to 31.

Processing after Completing Adjustments:

Order	Page	Address	Data	Procedure
1	6	01	00	Set the data, and press PAUSE button.
2	6	48	00	Set the data.
3	0	01	00	Set the data.
4				Perform "White Balance Check".

13. White Balance Check RadarW

Subject	Clear chart (Color reproduction adjustment frame)	
Filter	Filter C14 for color temperature correction ND filter 1.0 and 0.4 and 0.1	
Measurement Point	Video terminal of AUDIO/VIDEO jack	Display data of page 1 (Note3)
Measuring Instrument	Vectorscope	Adjustment remote commander
Specified Value 1	Fig. 6-1-13. A to B	
Specified Value 2	R ratio : 2A80 to 2B00 B ratio : 5BC0 to 5C40	
Specified Value 3	8000 to 8BC0	

Note1: Perform "Auto White Balance Adjustment" before this adjustment. If not performed, R ratio data and B ratio data may not satisfy the specified value 2.
Note2: The data of page: 0, address: 10 must be "00".
Note3: Displayed data of the adjustment remote commander.
1 : XX : XX
└── Display data

Switch setting:
1) MODE ..... CAMERA
2) NIGHT SHOT ..... OFF
3) DIGITAL ZOOM (Menu setting) ..... OFF
4) STEADY SHOT (Menu setting) ..... OFF

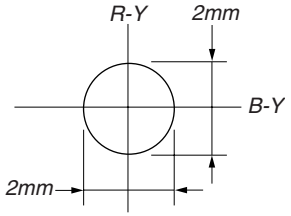


Fig. 6-1-13 (A).

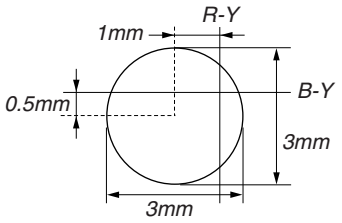


Fig. 6-1-13 (B).

Checking method:

Order	Page	Address	Data	Procedure
				Indoor white balance check
1				Check that the lens is not covered with either filter.
2	6	48	02	Set the data.
3	6	01	0F	Set the data, and press PAUSE button.
4				Check that the center of the white luminance point is within the circle shown Fig. 6-1-13. A.
5	6	01	00	Set the data, and press PAUSE button.
				Outdoor white balance check
6				Place the C14 filter on the lens.
7	6	01	3F	Set the data, and press PAUSE button.
8				Check that the center of the white luminance point is within the circle shown Fig. 6-1-13. B.
9	0	03	04	Set the data.
10	1			Check that the display data (Note3) satisfies the R ratio specified value.
11	0	03	05	Set the data.
12	1			Check that the display data (Note3) satisfies the B ratio specified value.
13				Remove the C14 filter.
				LV data check
14				Place the ND filter 1.5 (1.0+0.1+0.4) on the lens.
15	6	01	00	Set the data, and press PAUSE button.
16	0	03	06	Set the data.
17	1			Check that the display data (Note3) satisfies the specified value 3.

Processing after Completing Adjustments

Order	Page	Address	Data	Procedure
1	0	03	00	Set the data.
2	6	01	00	Set the data, and press PAUSE button.
3				Remove the ND filter.

14. Steady Shot Check RadarW

Precautions on the Parts Replacement
There are two types of repair parts.
Type A : ENC03MA
Type B : ENC03MB
Replace the broken sensor with a same type sensor. If replace with other type parts, the image will vibrate up and down or left and right during hand-shake correction operations.

Precautions on Angular Velocity Sensor
The sensor incorporates a precision oscillator. Handle it with care as if it dropped, the balance of the oscillator will be disrupted and operations will not be performed properly.

Subject	Arbitrary
Measurement Point	Display data of page 1 (Note1)
Measuring Instrument	Adjustment remote commander
Specified Value	2680 to 5080

Note1: Displayed data of the adjustment remote commander.
1 : XX : XX
└── Display data
Note2: The data of page: 0, address: 10 must be “00”.

Switch setting:
1) STEADY SHOT (CAMERA SET menu) ..... ON
2) ZOOM ..... TELE end

Adjusting method:

Order	Page	Address	Data	Procedure
				Pitch sensor check (SE-141 board SE401)
1	0	03	11	Set the data.
2	1			Check that the display data (Note1) satisfies the specified value. (Note3)
				Yaw sensor check (SE-141 board SE402)
3	0	03	12	Set the data.
4	1			Check that the display data (Note1) satisfies the specified value. (Note3)
5	0	03	00	Set the data.
6				Move the camcorder, and check that the steady shot operations have been performed normally

Note3: Don’t move the camcorder.

1-4. ELECTRONIC VIEWFINDER SYSTEM ADJUSTMENT

Note1: When replacing the LCD unit, be careful to prevent damages caused by static electricity.

Note2: Before performing the adjustments, check the data of page: 0, address: 10 is "00". If not, set data: 00 to this address.

Note3: As the PANEL OPEN switch is attached to the cabinet (R), this cabinet must be attached when performing adjustments.
If you perform the adjustments with cabinet (R) removed, set the following data.
1) Select page: 3, address: C4, and set data: 67.
2) Select page: 3, address: C5, and set data: 01.
Reset the data after completing adjustment.
1) Select page: 3, address: C4, and set data: 00.
2) Select page: 3, address: C5, and set data: 00.

Switch setting:

LCD panel ..... Closed

1. EVF Automatic Adjustment (VC-350 board) RadarW

This adjustment does the following adjustment items automatically.
VCO adjustment
Contrast adjustment

Mode	CAMERA
Subject	Arbitrary
Adjustment Page	C
Adjustment Address	3F, 40 (VCO adj.) 47 (Contrast adj.)

Note1: The data of page: 0, address: 10 must be "00".

Adjusting method:

Order	Page	Address	Data	Procedure
1	0	01	01	Set the data.
2	C	71	00	Set the data, and press PAUSE button.
3	3	01	5A	Set the data, and press PAUSE button.
4	3	02		Check that the data changes to "00".
5	3	03		Check that the data is "00". (Note2)
6	C	3F		Read the data, and this data is named D_{3F}.
7				Convert D_{3F} to decimal notation, and obtain D_{3F}'. (Note3)
8				Calculate D_{40}' using following equations (Decimal calculation) When $D_{3F}' \geqq 10$ $D_{40}' = D_{3F}' - 10$ When $D_{3F}' < 10$ $D_{40}' = 0$
9				Convert D_{40}' to a hexadecimal number, and obtain D_{40}. (Note3)
10	C	40	D_{40}	Set the data, and press PAUSE button.
11	C	71	41	Set the data, and press PAUSE button.
12	0	01	00	Set the data.

Note2: If the data is "01", adjustment has errors. Contents of the error is written into page: 3, addresses: C6. See the following table.

Data of page: 3, address: C6	Contents of error
5E	VCO adjustment error
61	Contrast adjustment error

Note3: Refer to "Table 6-4-1. Hexadecimal-decimal Conversion Table".

1-5. LCD SYSTEM ADJUSTMENT

Note1: When replacing the LCD unit, be careful to prevent damages caused by static electricity.
Note2: Before performing the adjustments, check the data of page: 0, address: 10 is “00”. If not, set data: 00 to this address.

Switch setting:
LCD panel ..... Open

1. LCD Automatic Adjustment (PD-213 board) RadarW

This adjustment does the following adjustment items automatically.
VCO adjustment
Contrast adjustment

Mode	CAMERA
Subject	Arbitrary
Adjustment Page	C
Adjustment Address	50, 51 (VCO adj.) 58 (Contrast adj.)

Note1: The data of page: 0, address: 10 must be “00”.

Adjusting method:

Order	Page	Address	Data	Procedure
1	0	01	01	Set the data.
2	C	70	00	Set the data, and press PAUSE button.
3	3	01	5A	Set the data, and press PAUSE button.
4	3	02		Check that the data changes to “00”.
5	3	03		Check that the data is “00”. (Note2)
6	C	50		Read the data, and this data is named D_{50}.
7				Convert D_{50} to decimal notation, and obtain D_{50}’. (Note3)
8				Calculate D_{51}’ using following equations (Decimal calculation) When D_{50}’ ≧ 10 D_{51}’ = D_{50}’ – 10 When D_{50}’ < 10 D_{51}’ = 0
9				Convert D_{51}’ to a hexadecimal number, and obtain D_{51}. (Note3)
10	C	51	D_{51}	Set the data, and press PAUSE button.
11	C	70	41	Set the data, and press PAUSE button.
12	0	01	00	Set the data.

Note2: If the data is “01”, adjustment has errors. Contents of the error is written into page: 3, addresses: C6. See the following table.

Data of page: 3, address: C6	Contents of error
58	VCO adjustment error
60	Contrast adjustment error

Note3: Refer to “Table 6-4-1. Hexadecimal-decimal Conversion Table”.

2. V COM Adjustment (PD-213 board)

Set the DC bias of the common electrode drive signal of LCD to the specified value.
If deviated, the LCD display will move, producing flicker and conspicuous vertical lines.

Mode	CAMERA
Subject	Arbitrary
Measurement Point	Check on LCD display
Measuring Instrument	
Adjustment Page	C
Adjustment Address	52
Specified Value	The brightness difference between the section A and section B is minimum.

Note1: This adjustment should be carried out upon completion of the LCD automatic adjustment.
Note2: The data of page: 0, address: 10 must be “00”.

Switch setting:
LCD BACKLIGHT ..... ON

Adjusting method:

Order	Page	Address	Data	Procedure
1	0	01	01	Set the data.
2	C	61	CD	Set the data, and press PAUSE button.
3	C	52		Change the data so that the brightness of the section A and that of the section B is equal.
4	C	52		Subtract 7 from the data.
5	C	52		Press PAUSE button.
6	C	61	C5	Set the data, and press PAUSE button.
7	0	01	00	Set the data.

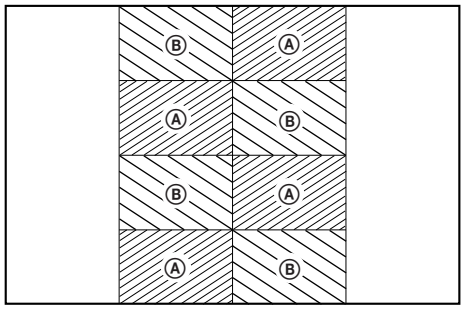


Fig. 6-1-14.

3. Transmissive Mode White Balance Adjustment (PD-213 board)

Correct the white balance of the transmissive mode.
If deviated, the reproduction of the LCD screen may degenerate.

Mode	CAMERA
Subject	Arbitrary
Measurement Point	Check on LCD screen
Measuring Instrument	
Adjustment Page	C
Adjustment Address	56, 57
Specified Value	The LCD screen should not be colored.

Note1: Check the white balance only when replacing the following parts. If necessary, adjust them.
1. LCD panel
2. Light induction plate
3. IC602

Note2: The data of page: 0, address: 10 must be “00”.

Switch setting:
LCD BACKLIGHT ..... ON

Adjusting method:

Order	Page	Address	Data	Procedure
1	0	01	01	Set the data.
2	C	56	7D	Set the data, and press PAUSE button.
3	C	57	73	Set the data, and press PAUSE button.
4	C	57		Check that the LCD screen is not colored. If not colored, proceed to step 10.
5	C	56		Change the data so that the LCD screen is not colored.
6	C	56		Press PAUSE button.
7	C	57		Change the data so that the LCD screen is not colored.
8	C	57		Press PAUSE button.
9	C	57		If the LCD screen is colored, repeat steps 5 to 9.
10	0	01	00	Set the data.

4. Reflective Mode White Balance Adjustment RadarW (PD-213 board)

Correct the white balance of the reflective mode.
If deviated, the reproduction of the LCD screen may degenerate.

Mode	CAMERA
Subject	Arbitrary
Adjustment Page	C
Adjustment Address	7B, 7C

Note1: The data of page: 0, address: 10 must be “00”.

Switch setting:
LCD BACKLIGHT ..... OFF

Adjusting method:

Order	Page	Address	Data	Procedure
1	0	01	01	Set the data.
2	3	0C	20	Set the data, and press PAUSE button.
3	3	22	0F	Set the data, and press PAUSE button.
4	3	01	66	Set the data, and press PAUSE button.
5	3	02		Check that the data changes to “00”.
6	3	03		Check that the data is “00”. (Note2)
7	3	01	67	Set the data, and press PAUSE button.
8	3	02		Check that the data changes to “00”.
9	3	03		Check that the data is “00”. (Note2)
10	3	0C	00	Set the data, and press PAUSE button.
11	3	22	00	Set the data, and press PAUSE button.
12	0	01	00	Set the data.

Note2: If the data is “01”, adjustment becomes time out.

6-2. MECHANISM SECTION ADJUSTMENT

On the mechanism section adjustment

For detail of mechanism section adjustments, checks, and replacement of mechanism parts, refer to the separate volume "DV MECHANICAL ADJUSTMENT MANUAL Ⅷ Z (Z200) Mechanism".

Note: Before performing the adjustments, check the data of page: 0, address: 10 is "00". If not, set data: 00 to this address.

2-1. HOW TO ENTER RECORD MODE WITHOUT CASSETTE

1) Connect the adjustment remote commander to the LANC jack.
2) Turn the HOLD switch of the adjustment remote commander to the ON position.
3) Close the cassette compartment without the cassette.
4) Select page: 3, address: 01, and set data: 0C, and press the PAUSE button of the adjustment remote commander.
   (The mechanism enters the record mode automatically.)
   Note: The function buttons becomes inoperable.
5) To quit the record mode, select page: 3, address: 01, set data: 00, and press the PAUSE button of the adjustment remote commander. (Whenever you want to quit the record mode, be sure to quit following this procedure.)

2-2. HOW TO ENTER PLAYBACK MODE WITHOUT CASSETTE

1) Connect the adjustment remote commander to the LANC jack.
2) Turn the HOLD switch of the adjustment remote commander to the ON position.
3) Close the cassette compartment without the cassette.
4) Select page: 3, address: 01, and set data: 0B, and press the PAUSE button of the adjustment remote commander.
   (The mechanism enters the playback mode automatically.)
   Note: The function buttons becomes inoperable.
5) To quit the playback mode, select page: 3, address: 01, set data: 00, and press the PAUSE button of the adjustment remote commander. (Whenever you want to quit the playback mode, be sure to quit following this procedure.)

2-3. TAPE PATH ADJUSTMENT

1. Preparation for Adjustment

1) Clean the tape running side (tape guide, drum, capstan shaft, pinch roller, etc.).
2) Connect the adjustment remote commander to the LANC jack.
3) Turn the HOLD switch of the adjustment remote commander to the ON position.
4) Connect an oscilloscope to VC-350 board CN1007 via the CPC connecting jigs. (J-6082-521-A, J-6082-564-A)
   Channel 1: VC-350 board, CN1007 Pin ① (Note)
   External trigger: VC-350 board, CN1007 Pin ②
   Note: Connect a 75Ω resistor between Pins ① of CN1007 and ③ (GND).
5) Playback the alignment tape for tracking. (XH2-1)
6) Select page: 3, address: 33, and set data: 08.
7) Select page: 3, address: 26, set data: 31, and press PAUSE button.
8) Check that the oscilloscope RF waveform is normal at the entrance and exit.
   If not normal, adjust according to the separate volume "DV MECHANICAL ADJUSTMENT MANUAL Ⅷ Z (Z200) Mechanism".

CN1007 of VC-350 board

Pin No.	Signal Name
1	RF MON
2	SWP
3	GND
4	XCS EEP
5	EEP SCK
6	EEP SO
7	EEP SI
8	GND

Table 6-2-1.

2. Processing after Completing Operations:

1) Connect the adjustment remote commander to the LANC jack and set the HOLD switch to the ON position.
2) Select page: 3, address: 26, and set data: 00, and press PAUSE button.
3) Select page: 3, address: 33, and set data: 00.

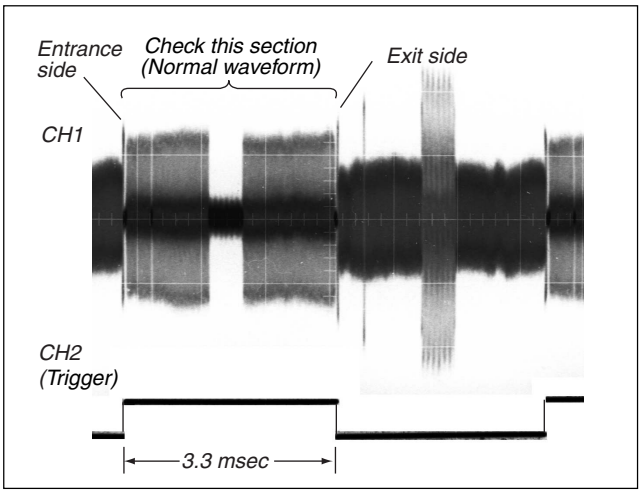


Fig. 6-2-1.

6-3. VIDEO SECTION ADJUSTMENT

3-1. PREPARATIONS BEFORE ADJUSTMENTS

Use the following measuring instruments for video section adjustments.

3-1-1. Equipment to Required

1) TV monitor
2) Oscilloscope (dual-phenomenon, band width above 30 MHz with delay mode) (Unless specified otherwise, use a 10 : 1 probe.)
3) Frequency counter
4) Pattern generator with video output terminal
5) Digital voltmeter
6) Audio generator
7) Audio level meter
8) Audio distortion meter
9) Audio attenuator
10) Regulated power supply
11) Alignment tapes
    - Tracking standard (XH2-1)
      Parts code: 8-967-997-01
    - SW/OL standard (XH2-3)
      Parts code: 8-967-997-11
    - Audio operation check for PAL (XH5-3P)
      Parts code: 8-967-997-55
    - System operation check for PAL (XH5-5P)
      Parts code: 8-967-997-66
12) Adjustment remote commander (J-6082-053-B)
13) CPC connecting jigs
    - CPC-15 (J-6082-564-A)
    - I/F unit for LANC control (J-6082-521-A)
14) Handycam station

3-1-2. Precautions on Adjusting

Note1: Before performing the adjustments, check the data of page: 0, address: 10 is "00". If not, set data: 00 to this address.

1) The adjustments of this unit are performed in the VTR mode (PLAY/EDIT mode) or camera mode (CAMERA mode).
   To set to the VTR mode, set the mode switch to "PLAY/EDIT" or set the "Forced VTR Power ON mode" using the adjusting remote commander (Note2).
   To set to the camera mode, set the mode switch to "CAMERA" or set the "Forced Camera Power ON mode" using the adjusting remote commander (Note3).
   After completing adjustments, be sure to exit the "Forced VTR Power ON Mode" or "Forced Camera Power ON Mode". (Note5)
2) The front cabinet block (FP-840 flexible) need not be connected. To remove it, disconnect the following connectors.
   FP-840 flexible CN101 (2P, 0.8mm)
   VC-350 board CN1004 (16P, 0.5mm)
3) The cabinet (R) block need not be connected except for the DC IN jack of the FP-841 flexible. (Except for "VIDEO SYSTEM ADJUST MENT".) To remove the cabinet (R) block, disconnect the following connectors.
   VC-350 board CN2001 (26P, 0.5mm)
   VC-350 board CN1010 (51P, 0.3mm)
   VC-350 board CN1011 (6P, 0.5mm)
   VC-350 board CN1006 (22P, 0.5mm)
   Remove the FP-841 flexible (DC IN jack, Battery terminal) from the cabinet (R) block. And connect it to the following connector of VC-350 board.
   VC-350 board CN2001 (26P, 0.5mm)
4) The top cabinet block (Microphone unit) need not be connected. To remove it, disconnect the following connectors.
   SE-140 board CN401 (6P, 0.5mm)
5) The lens block (CD-493 board) need not be connected. To remove it, disconnect the following connectors.
   VC-350 board CN3001 (14P, 0.5mm)
   VC-350 board CN3101 (23P, 0.3mm)
6) By setting the "Forced VTR Power ON mode", the VTR section can be operate even if the control switch block (SS6800) has been removed. When removing it, disconnect the following connector.
   VC-350 board CN1001 (18P, 0.5mm)
7) The EVF block (LB-096 board, SE-140 board) need not be connected. To remove them, disconnect the following connectors.
   VC-350 board CN9301 (20P, 0.5mm)
   VC-350 board CN1008 (39P, 0.3mm)
8) Disconnecting the VC-350 board CN1005 (removing the MS-201 board and control switch block (ZM-6800)) means removing the lithium 3V power supply (MS-201 board, BT501), data such as date, time, user-set menus will be lost. After completing adjustments, reset these data.
   But, the self-diagnosis data and the data on history of use (total drum rotation time etc.) will be kept even if the MS-201 board has been removed. (Refer to "6-4.Service Mode" for the data on the history use and the self-diagnosis data.)
   To remove the MS-201 board and control switch block (ZM6800), disconnect the following connectors.
   VC-350 board CN1005 (20P 0.5mm)

Note2: Setting the "Forced VTR Power ON" mode (PLAY/EDIT mode)
1) Select page: 0, address: 01, and set data: 01.
2) Select page: D, address: 10, set data: 02, and press the PAUSE button of the adjusting remote commander.
The above procedure will enable the VTR power to be turned on with the control switch block (SS-6800 block) removed.
After completing adjustments, be sure to exit the "Forced Power ON mode".

Note3: Setting the "Forced Camera Power ON" mode (CAMERA-TAPE mode)
1) Select page: 0, address: 01, and set data: 01.
2) Select page: D, address: 10, set data: 01, and press the PAUSE button of the adjusting remote commander.
The above procedure will enable the camera power to be turned on with the control switch block (SS-6800 block) removed.
After completing adjustments, be sure to exit the "Forced Power ON mode".

Note4: Exiting the "Forced Power ON" mode
1) Select page: 0, address: 01, and set data: 01.
2) Select page: D, address: 10, set data: 00, and press the PAUSE button of the adjusting remote commander.
3) Select page: 0, address: 01, and set data: 0

3-1-3. Adjusting Connectors

The measuring point of the playback RF signal is CN1007 of VC-350 board. Connect the measuring instruments via the CPC connecting jigs (J-6082-521-A, J-6082-564-A). Refer to "MECHANISM SECTION ADJUSTMENT" for the measuring method. The following table lists the pin numbers and signal names of CN1007.

Pin No.	Signal Name
1	RF MON
2	SWP
3	GND
4	XCS EEP
5	EEP SCK
6	EEP SO
7	EEP SI
8	GND

Table 6-3-1.

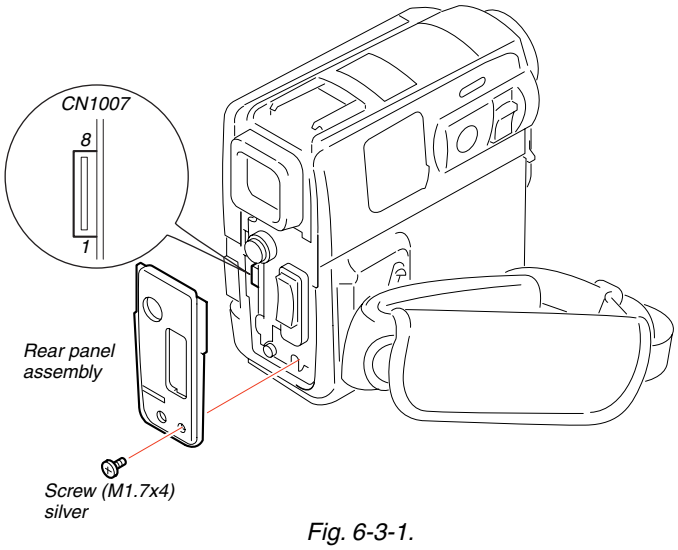


Fig. 6-3-1.

3-1-4. Connecting the Equipment

Connect the measuring instruments as shown in Fig. 6-3-2, and perform the adjustments.

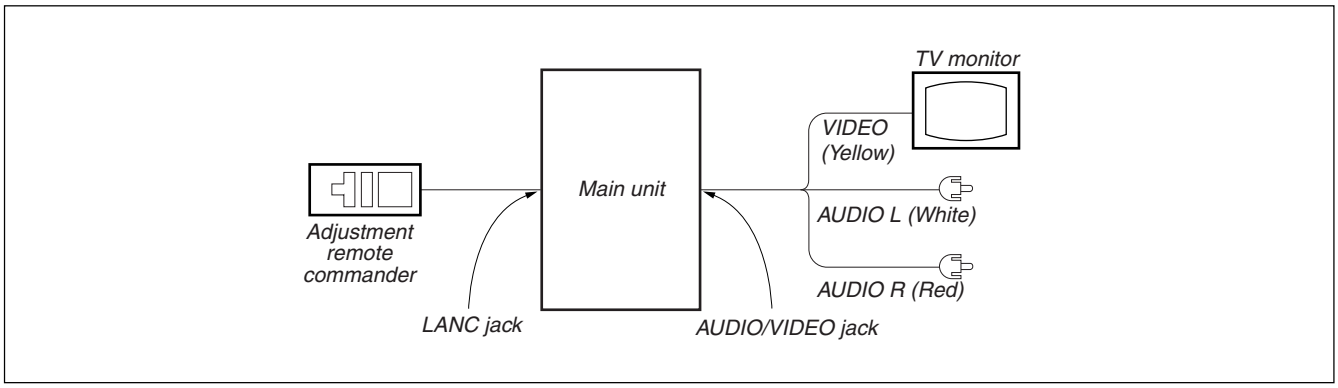


Fig. 6-3-2.

3-1-5. Alignment Tapes

Use the alignment tapes shown in the following table.
Use tapes specified in the signal column of each adjustment.

Name	Use
Tracking standard (XH2-1)	Tape path adjustment
SW/OL standard (XH2-3)	Switching position adjustment
Audio operation check (XH5-3P)	Audio system adjustment
System operation check (XH5-5P)	Operation check

Fig. 6-3-3 shows the 75% color bar signals recorded on the alignment tape for Audio Operation Check.

Note: Measure with video terminal (Terminated at 75 Ω)

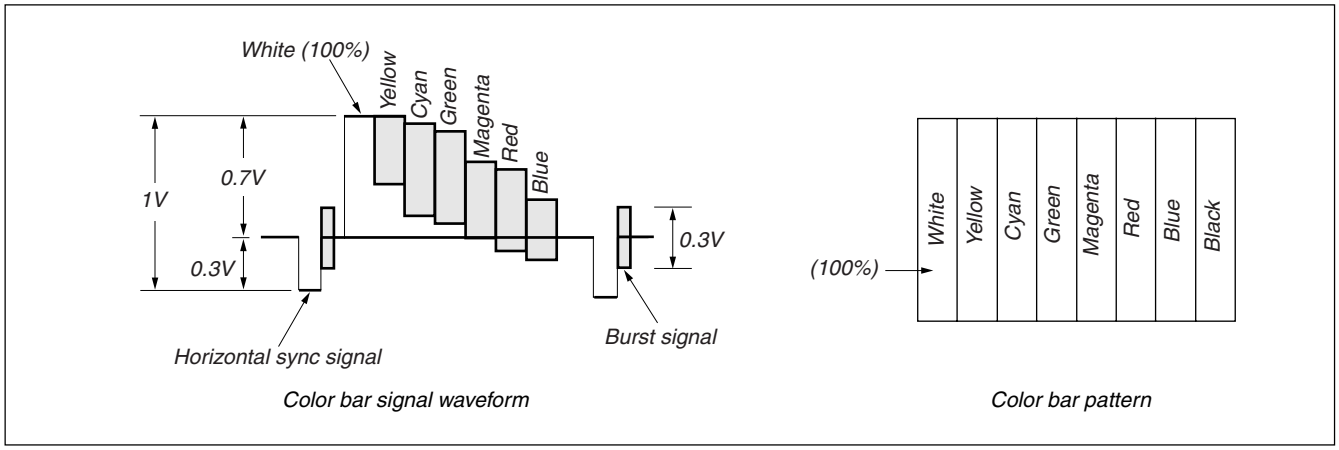


Fig. 6-3-3. Color bar signal of alignment tapes

3-1-6. Input/Output Level and Impedance

Video input/output
- A/V jack
- Video signal: 1 Vp-p, 75 Ω unbalanced, sync negative

S video input/output
- 4-pin mini DIN (Handycam station)
- Luminance signal: 1 Vp-p, 75 Ω unbalanced, sync negative
- Chrominance signal: 0.300 Vp-p, 75 Ω unbalanced

Audio input/output
- A/V jack
- Input level: 327mV
- Input impedance: More than 47kΩ
- Output level: 327 mV (at load impedance 47 kΩ)
- Output impedance: Below 2.2 kΩ

3-2. SYSTEM CONTROL SYSTEM ADJUSTMENT

1. Initialization of 8, A, C, D, E, F, 1C, 1F Page Data

If the 8, A, C, D, E, F, 1C, 1F page data is erased due to some reason, perform "1-2. INITIALIZATION OF 8, A, C, D, E, F, 1C, 1F PAGE DATA" of "6-1. CAMERA SECTION ADJUSTMENT"
Note: When reading or writing the 1C, 1F page data, select page: 0, address: 10, and set data: 01, then select C or F page. The 1C or 1F page can be chosen by this data setting.
After reading or writing, reset the data of page: 0, address: 10 to "00".

2. Touch Panel Adjustment

Adjust the calibration of the touch panel.

Mode	PLAY/EDIT (VTR stop)
Signal	Arbitrary
Adjustment Page	A
Adjustment Address	82 to 85

Note1 : This adjustment should be carried out upon completion of the LCD system adjustments.
Note2 : Perform this adjustment with observing the screen from the front.
Note3 : Check that the LCD panel is not reverse mode.
Note4 : The data of page: 0, address: 10 must be "00".

Adjusting method:

1) Select page: 7, address: 05, and set data: 01.
2) Using a stylus, push the center of "X" indicated in the part A.
3) Using a stylus, push the center of "X" indicated in the part B.
4) Using a stylus, push the center of "X" indicated in the part C.
5) Select page: 7, address: 05, and check that the data is "00".

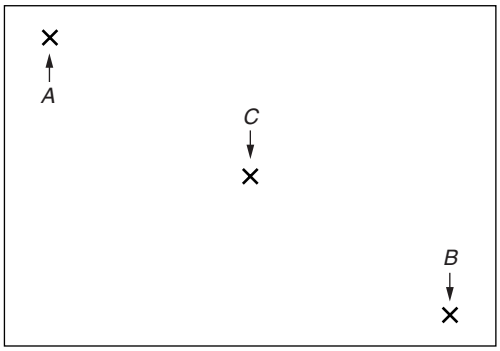


Fig. 6-3-4.

3. Serial No. Input

3-1. Company ID Input

Write the company ID in the EEPROM (nonvolatile memory).

Page	C
Address	E0, E1, E2, E3, E4

Note: The data of page: 0, address: 10 must be "00".

Input method:

1) Select page: 0, address: 01, and set data: 01.
2) Input the following data to page: C, addresses: E0 to E4.
   Note: Press the PAUSE button of the adjustment remote commander each time to set the data.

Address	Data
E0	08
E1	00
E2	46
E3	01
E4	02

3) Select page: 0, address: 01, and set data: 00.

3-2. Serial No. Input

Write the serial No. and model code in the EEPROM (nonvolatile memory). Convert the serial No. on the name plate from decimal to hexadecimal, and write in the EEPROM.

Page	C
Address	E5, E6, E7

Note: The data of page: 0, address: 10 must be "00".

Input method:

1) Select page: 0, address: 01, and set data: 01.
2) Read the serial No. on the name plate, and take it as D_1.
   Example: If the serial No. is 77881.
   D_1=77881
   Note: Use six digits of the low rank when a serial No. is more than seven digits.
3) Obtain D_2 and H_1 corresponding to D_1 from Table 6-3-2.
   Example: If D_1 is "77881".
   $D_2 = D_1 - 65536 = 12345$
   H_1 = FE
4) Input H_1 to page: C, address: E5. (Model code input)
   Example: If H_1 is "FE".
   Select page: C, address: E5, set data: FE, andpress the PAUSE button.
5) Obtain the maximum decimal not exceeding D_2 from Table 6-3-3, and take this as D_3.
   Example: If D_2 is "12345".
   D_3 = 12288
6) Obtain the hexadecimal corresponding to D_3 from Table 6-3-3, and take this as H_3.
   Example: If D_3 is "12288".
   H_3 = 3000
7) Obtain the difference D_4 between D_2 and D_3. (Decimal calculation, $0 \leqq D_4 \leqq 255$)
   $D_4 = D_2 - D_3$
   Example: If D_2 is "12345" and D_3 is "12288".
   D_4 =12345 – 12288 = 57
8) Convert D_4 to hexadecimal, and take this as H_4.
   (Refer to "Hexadecimal-decimal conversion table" in "6-4. Service Mode".)
   Example: If D_4 is "57".
   H_4=39
9) Input the upper 2 digits of H_3 to page: C, address: E6.
   Example: If H_3 is "3000".
   Select page: C, address: E6, set data: 30, and press the PAUSE button.
10) Input H_4 to page: C, address: E7.
    Example: If H_4 is "39".
    Select page: C, address: E7, set data: 39, and press the PAUSE button.
11) Select page: 0, address: 01, and set data: 00.

D_1 (Decimal)	D_2 (Decimal)	H_1 (Hexadecimal) (Service model code)
000001 to 065535	D_1	FE
065536 to 131071	D_1 – 65536	FE
131072 to 196607	D_1 – 131072	FE
196608 to 262143	D_1 – 196608	FE
262144 to 327679	D_1 – 262144	FE
327680 to 393215	D_1 – 327680	FE
393216 to 458751	D_1 – 393216	FE
458752 to 524287	D_1 – 458752	FE
524288 to 589823	D_1 – 524288	FE
589824 to 655359	D_1 – 589824	FE
655360 to 720895	D_1 – 655360	FE
720896 to 786431	D_1 – 720896	FE
786432 to 851967	D_1 – 786432	FE
851968 to 917503	D_1 – 851968	FE
917504 to 983039	D_1 – 917504	FE
983040 to 999999	D_1 – 983040	FE

Table 6-3-2.

Decimal (D_3)	Hexa-decimal (H_3)	Decimal (D_3)	Hexa-decimal (H_3)	Decimal (D_3)	Hexa-decimal (H_3)	Decimal (D_3)	Hexa-decimal (H_3)	Decimal (D_3)	Hexa-decimal (H_3)	Decimal (D_3)	Hexa-decimal (H_3)	Decimal (D_3)	Hexa-decimal (H_3)	Decimal (D_3)	Hexa-decimal (H_3)
0	0000	8192	2000	16384	4000	24576	6000	32768	8000	40960	A000	49152	C000	57344	E000
256	0100	8448	2100	16640	4100	24832	6100	33024	8100	41216	A100	49408	C100	57600	E100
512	0200	8704	2200	16896	4200	25088	6200	33280	8200	41472	A200	49664	C200	57856	E200
768	0300	8960	2300	17152	4300	25344	6300	33536	8300	41728	A300	49920	C300	58112	E300
1024	0400	9216	2400	17408	4400	25600	6400	33792	8400	41984	A400	50176	C400	58368	E400
1280	0500	9472	2500	17664	4500	25856	6500	34048	8500	42240	A500	50432	C500	58624	E500
1536	0600	9728	2600	17920	4600	26112	6600	34304	8600	42496	A600	50688	C600	58880	E600
1792	0700	9984	2700	18176	4700	26368	6700	34560	8700	42752	A700	50944	C700	59136	E700
2048	0800	10240	2800	18432	4800	26624	6800	34816	8800	43008	A800	51200	C800	59392	E800
2304	0900	10496	2900	18688	4900	26880	6900	35072	8900	43264	A900	51456	C900	59648	E900
2560	0A00	10752	2A00	18944	4A00	27136	6A00	35328	8A00	43520	AA00	51712	CA00	59904	EA00
2816	0B00	11008	2B00	19200	4B00	27392	6B00	35584	8B00	43776	AB00	51968	CB00	60160	EB00
3072	0C00	11264	2C00	19456	4C00	27648	6C00	35840	8C00	44032	AC00	52224	CC00	60416	EC00
3328	0D00	11520	2D00	19712	4D00	27904	6D00	36096	8D00	44288	AD00	52480	CD00	60672	ED00
3584	0E00	11776	2E00	19968	4E00	28160	6E00	36352	8E00	44544	AE00	52736	CE00	60928	EE00
3840	0F00	12032	2F00	20224	4F00	28416	6F00	36608	8F00	44800	AF00	52992	CF00	61184	EF00
4096	1000	12288	3000	20480	5000	28672	7000	36864	9000	45056	B000	53248	D000	61440	F000
4352	1100	12544	3100	20736	5100	28928	7100	37120	9100	45312	B100	53504	D100	61696	F100
4608	1200	12800	3200	20992	5200	29184	7200	37376	9200	45568	B200	53760	D200	61952	F200
4864	1300	13056	3300	21248	5300	29440	7300	37632	9300	45824	B300	54016	D300	62208	F300
5120	1400	13312	3400	21504	5400	29696	7400	37888	9400	46080	B400	54272	D400	62464	F400
5376	1500	13568	3500	21760	5500	29952	7500	38144	9500	46336	B500	54528	D500	62720	F500
5632	1600	13824	3600	22016	5600	30208	7600	38400	9600	46592	B600	54784	D600	62976	F600
5888	1700	14080	3700	22272	5700	30464	7700	38656	9700	46848	B700	55040	D700	63232	F700
6144	1800	14336	3800	22528	5800	30720	7800	38912	9800	47104	B800	55296	D800	63488	F800
6400	1900	14592	3900	22784	5900	30976	7900	39168	9900	47360	B900	55552	D900	63744	F900
6656	1A00	14848	3A00	23040	5A00	31232	7A00	39424	9A00	47616	BA00	55808	DA00	64000	FA00
6912	1B00	15104	3B00	23296	5B00	31488	7B00	39680	9B00	47872	BB00	56064	DB00	64256	FB00
7168	1C00	15360	3C00	23552	5C00	31744	7C00	39936	9C00	48128	BC00	56320	DC00	64512	FC00
7424	1D00	15616	3D00	23808	5D00	32000	7D00	40192	9D00	48384	BD00	56576	DD00	64768	FD00
7680	1E00	15872	3E00	24064	5E00	32256	7E00	40448	9E00	48640	BE00	56832	DE00	65024	FE00
7936	1F00	16128	3F00	24320	5F00	32512	7F00	40704	9F00	48896	BF00	57088	DF00	65280	FF00

Table 6-3-3.

3-3. SERVO AND RF SYSTEM ADJUSTMENT

Before perform the servo and RF system adjustments, check that the specified value of "36 MHz Origin Oscillation Adjustment" of "CAMERA SYSTEM ADJUSTMENT" is satisfied.
And check that the data of page: 0, address: 10 is "00". If not, set data: 00 to this address.

Adjusting Procedure:

1. CAP FG duty adjustment
2. Switching position adjustment
3. Error rate check

1. Cap FG Duty Adjustment (VC-350 Board) RadarW

Set the Cap FG signal duty cycle to 50% to establish an appropriate capstan servo. If deviated, the uneven rotation of capstan and noise can occur.

Measurement Point	Display data of page: 3, address: 02, 03
Measuring Instrument	Adjustment remote commander
Adjustment Page	C
Adjustment Address	16
Specified Value	Data of page: 3, address: 02 is "00". Data of page: 3, address: 03 is "00".

Note1: The data of page: 0, address: 10 must be "00".

Adjusting method:

Order	Page	Address	Data	Procedure
1				Close the cassette compartment without inserting a cassette.
2	0	01	01	Set the data.
3	3	01	1B	Set the data, and press PAUSE button.
4	3	02		Check that the data changes in the following order. "1B" → "2B" → "00"
5	3	03		Check that the data is "00". (Note2)
6	0	01	00	Set the data.

Note2: If the data is "01", adjustment has errors or the mechanism deck is defective.

2. Switching Position Adjustment (VC-350 Board) RadarW

To obtain normal playback waveform output during the playback mode, adjust the switching position.

Mode	VTR playback (PLAY/EDIT)
Signal	SW/OL reference tape (XH2-3)
Measurement Point	Display data of page: 3, address: 02, 03
Measuring Instrument	Adjustment remote commander
Adjustment Page	C
Adjustment Address	10, 11, 12, 13
Specified Value	Data of page: 3, address: 02 is "00". Data of page: 3, address: 03 is "00".

Note1: The data of page: 0, address: 10 must be "00".

Adjusting method:

Order	Page	Address	Data	Procedure
1				Insert the SW/OL reference tape and enter the VTR STOP mode.
2	0	01	01	Set the data.
3	C	10	EE	Set the data, and press PAUSE button.
4	3	21		Check that the data is "02". (Note2)
5	3	01	0D	Set the data, and press PAUSE button.
6	3	02		Check that the data changes to "00".
7	3	03		Check that the data is "00". (Note3)
8	0	01	00	Set the data.

Note2: If the data of page: 3, address: 21 is "72", the tape top being played. After playing the tape for 1 to 2 seconds, stop it, perform step 5 and higher.
If the data of page: 3, address: 21 is "62", the tape end being played. After rewinding the tape, perform step 5 and higher.

Note3: If bit 0 of the data is "1", the EVEN channel is defective. If bit 1 is "1", the ODD channel is defective. Contents of the defect is written into page: C, addresses: 10 and 12. See the following table. (For the bit values, refer to "6-4. SERVICE MODE", "4-3. 4. Bit value discrimination".) If bit 3 of the data is "1", the tape end being played, so rewind the tape and perform the adjustment again.

When the EVEN channel is defective

Data of page: C, address: 10	Contents of defect
EE	Writing into EEPROM (IC8602) is defective
E8	Adjustment data is out of range
E7	No data is returned from IC6001

When the ODD channel is defective

Data of page: C, address: 12	Contents of defect
EE	Writing into EEPROM (IC8602) is defective
E8	Adjustment data is out of range
E7	No data is returned from IC6001

3. Error Rate Check RadarW

3-1. Preparations before adjustments

Mode	Camera recording (CAMERA)
Subject	Arbitrary

Note1: The data of page: 1C, address: B3 to C8 must be initial value. (See Table 6-3-4.)

Adjusting method:

Order	Page	Address	Data	Procedure
1	0	01	01	Set the data.
2	0	10	01	Set the data.
3	C	0D	C8	Set the data, and press PAUSE button.
4	0	10	00	Set the data.
5				Record the camera signal for two minutes.

3-2. Error Rate Check

Mode	Playback (PLAY/EDIT)
Signal	Recorded signal at “Preparations before adjustments”
Measurement Point	Display data of page: 3, address: 02, 03
Measuring Instrument	Adjustment remote commander
Adjustment Page	1C (Note2)
Adjustment Address	B3 to C8
Specified Value	Data of page: 3, address: 02 is “00”. Data of page: 3, address: 03 is “00”.

Note2: When reading or writing the 1C page data, select page: 0, address: 10, and set data: 01, then select C page. The 1C page can be chosen by this data setting.
After reading or writing, reset the data of page: 0, address: 10 to “00”.

Adjusting method:

Order	Page	Address	Data	Procedure
1				Playback the recorded signal at “Preparations before adjustments”
2	0	01	01	Set the data.
3	0	10	00	Set the data.
4	3	1D		Check that the data is “20”.
5	3	01	40	Set the data, and press PAUSE button.
6	3	02		Check that the data changes from “40” to “00”.
7	3	03		Check that the data is “00”. (Note3)
8				Perform “Processing after Completing Adjustments”

Note3: If the data is other than “00”, Error rate is abnormal.
For the contents of the abnormality, see the following table.

Data of page: 3, address: 03	Contents of the abnormality
01	EVEN ch is abnormal.
02	ODD ch is abnormal.
03	EVEN ch and ODD ch are abnormal.

Note4: If Error rate is abnormal, Check the use tape, clean the tape running surface. And after inputting initial values to page 1C: address: B3 to C8, perform re-adjustment. (See Table 6-3-4.)

Initial Value of Page 1C: Address: B3 to C8

Address	Initial value	Address	Initial value	Address	Initial value
B3	00	BB	00	C3	80
B4	00	BC	00	C4	00
B5	00	BD	00	C5	00
B6	00	BE	00	C6	00
B7	00	BF	00	C7	00
B8	80	C0	00	C8	00
B9	00	C1	00		
BA	00	C2	00		

Table 6-3-4.

Note5: When writing the 1C page data, select page: 0, address: 10, and set data: 01, then select C page.
After writing the initial values, reset the data of page: 0, address: 10 to “00”.

3-3. Processing after Completing Adjustments

Order	Page	Address	Data	Procedure
1	0	01	01	Set the data.
2	0	10	01	Set the data.
3	C	0D	00	Set the data, and press PAUSE button.
4	0	01	00	Set the data.
5	0	10	00	Set the data.

3-4. VIDEO SYSTEM ADJUSTMENTS

Note1: Before perform the video system adjustments, check that the specified value of "36MHz Origin Oscillation Adjustment" of "CAMERA SYSTEM ADJUSTMENT" is satisfied.
And check that the data of page: 0, address: 10 is "00". If not, set data: 00 to this address.

Note2: Attach the handycam station, and perform the following adjustments.

1. S VIDEO OUT Y Level Adjustment (VC-350 Board)

Mode	CAMERA
Subject	Arbitrary
Measurement Point	Y signal terminal of S VIDEO jack of Handycam station (75Ω terminated)
Measuring Instrument	Oscilloscope
Adjustment Page	C
Adjustment Address	25
Specified Value	A = 1000 ± 14mV

Note: The data of page: 0, address: 10 must be "00".

Switch setting:
DEMO MODE (Menu setting) ..... OFF

Adjusting method:

Order	Page	Address	Data	Procedure
1	0	01	01	Set the data.
2	8	A0	0C	Set the data, and press PAUSE button.
3	3	0C	02	Set the data, and press PAUSE button.
4	C	25		Change the data and set the Y signal level (A) to the specified value.
5	C	25		Press PAUSE button.
6	3	0C	00	Set the data, and press PAUSE button.
7	8	A0	04	Set the data, and press PAUSE button.
8	0	01	00	Set the data.

2. S VIDEO OUT Chroma Level Adjustment (VC-350 Board)

Mode	CAMERA
Subject	Arbitrary
Measurement Point	Chroma signal terminal of S VIDEO jack of Handycam station (75Ω terminated) External trigger: Y signal terminal of S VIDEO jack of Handycam station
Measuring Instrument	Oscilloscope
Adjustment Page	C
Adjustment Address	26, 27
Specified Value	Cr level : A = 700 ± 14mV Cb level : B = 700 ± 14mV Burst level : C = 300 ± 6mV

Note: The data of page: 0, address: 10 must be "00".

Switch setting:
DEMO MODE (Menu setting) ..... OFF

Adjusting method:

Order	Page	Address	Data	Procedure
1	0	01	01	Set the data.
2	8	A0	0C	Set the data, and press PAUSE button.
3	3	0C	02	Set the data, and press PAUSE button.
4	C	26		Change the data and set the Cr signal level (A) to the specified value.
5	C	26		Press PAUSE button.
6	C	27		Change the data and set the Cb signal level (B) to the specified value.
7	C	27		Press PAUSE button.
8				Check that the burst signal level (C) is satisfied the specified value.
9	3	0C	00	Set the data, and press PAUSE button.
10	8	A0	04	Set the data, and press PAUSE button.
11	0	01	00	Set the data.

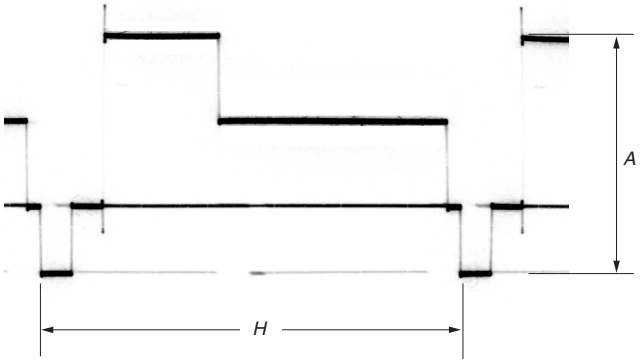


Fig. 6-3-5.

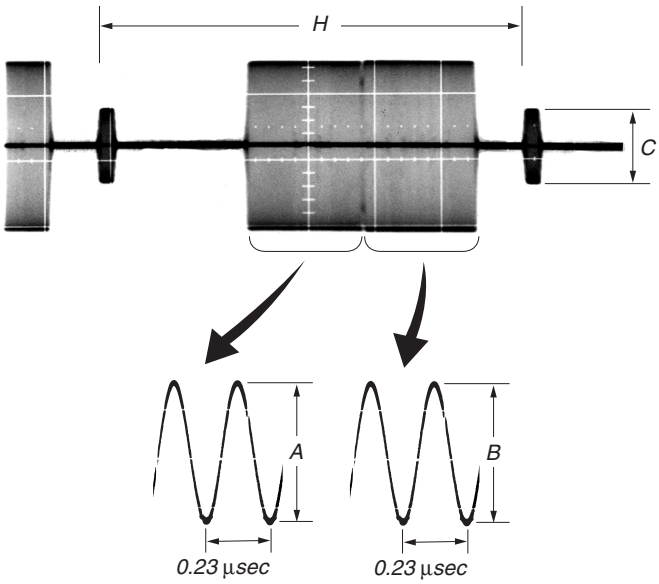


Fig. 6-3-6.

3. VIDEO OUT Y, Chroma Level Check (VC-350 Board)

Mode	CAMERA
Subject	Arbitrary
Measurement Point	Video jack of Handycam station (75Ω terminated)
Measuring Instrument	Oscilloscope
Specified Value	Sync level : A = 300 ± 18mV Burst level : B = 300 ± 18mV

Note: The data of page: 0, address: 10 must be "00".

Switch setting:
DEMO MODE (Menu setting) ..... OFF

Adjusting method:

Order	Page	Address	Data	Procedure
1	0	01	01	Set the data.
2	8	A0	0C	Set the data, and press PAUSE button.
3	3	0C	02	Set the data, and press PAUSE button.
4				Check that the sync signal level (A) satisfies the specified value.
5				Check that the burst signal level (B) satisfies the specified value.
6	3	0C	00	Set the data, and press PAUSE button.
7	8	A0	04	Set the data, and press PAUSE button.
8	0	01	00	Set the data.

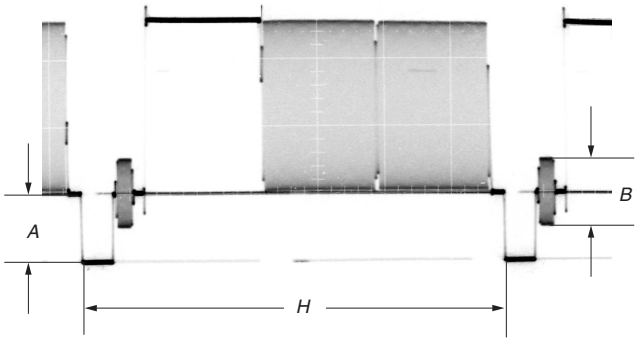


Fig. 6-3-7.

3-5. AUDIO SYSTEM ADJUSTMENTS

[Connection of Audio System Measuring Devices]

Connect the audio system measuring devices as shown in Fig. 6-3-8.

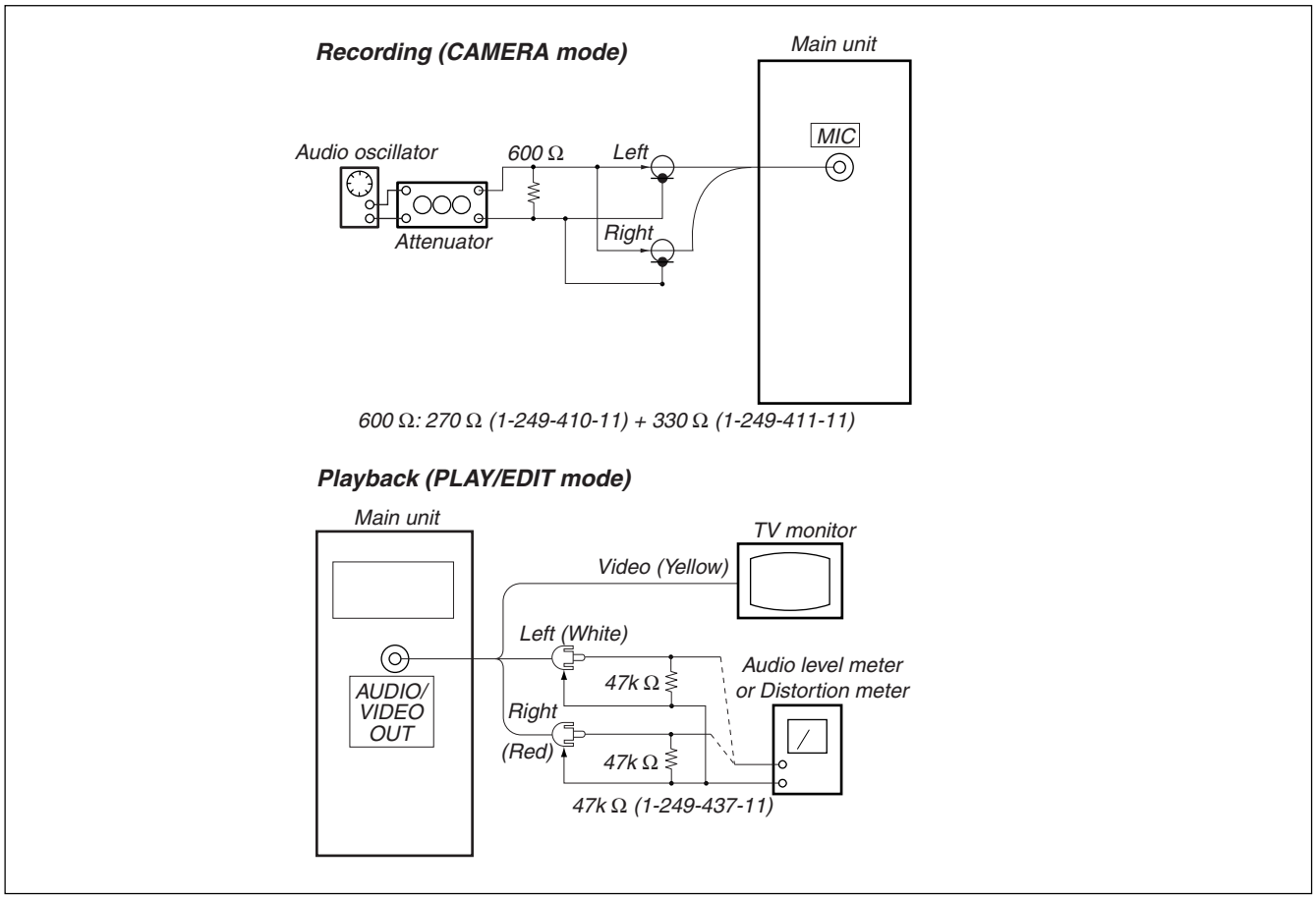


Fig. 6-3-8.

1. Playback Level Check

Mode	VTR playback
Signal	Alignment tape: For audio operation check (XH5-3P)
Measurement Point	Audio left or right terminal of AUDIO VIDEO jack
Measuring Instrument	Audio level meter and frequency counter
Specified Value	32 kHz mode: 1 kHz, +3.0 ± 2.0dBs 48 kHz mode: 1 kHz, +3.0 ± 2.0dBs 44.1 kHz mode: The 7.35kHz signal level during EMP OFF is +2.0 ± 2.0dBs. The 7.35kHz signal level during EMP ON is –6 ± 2 dB from the signal level during EMP OFF.

Checking Method:

1) Check that the playback signal level is the specified value.

2. Overall Level Characteristics Check

Mode	Camera recording and playback
Signal	400Hz, –66 dBs signal: MIC jack left and right
Measurement Point	Audio left or right terminal of AUDIO VIDEO jack
Measuring Instrument	Audio level meter
Specified Value	–7.5 ± 3.0dBs

Checking Method:

1) Input the 400Hz, –66dBs signal in the MIC jack.
2) Record in the camera mode.
3) Playback the recorded section.
4) Check that the 400Hz signal level is the specified value.

3. Overall Distortion Check

Mode	Camera recording and playback
Signal	400Hz, –66dBs signal: MIC jack left and right
Measurement Point	Audio left or right terminal of AUDIO VIDEO jack
Measuring Instrument	Audio distortion meter
Specified Value	Below 0.4% (200Hz to 6kHz BPF ON)

Checking Method:

1) Input the 400Hz, –66dBs signal in the MIC jack.
2) Record in the camera mode.
3) Playback the recorded section.
4) Check that the distortion is the specified value.

4. Overall Noise Level Check

Mode	Camera recording and playback
Signal	No signal: Insert a shorting plug in the MIC jack
Measurement Point	Audio left or right terminal of AUDIO VIDEO jack
Measuring Instrument	Audio level meter
Specified Value	Below –45dBs (IHF-A filter ON, 20kHz LPF ON)

Checking Method:

1) Insert a shorting plug in the MIC jack.
2) Record in the camera mode.
3) Playback the recorded section.
4) Check that the noise level is the specified value.

5. Overall Separation Check

Mode	Camera recording and playback
Signal	400Hz, –66dBs signal: MIC jack <right> [left] (Connect the MIC jack <left> [right] to GND)
Measurement Point	Audio <left> [right] terminal of AUDIO VIDEO jack
Measuring Instrument	Audio level meter
Specified Value	Below –40dBs (IHF-A filter ON)

< > : Left channel check
[ ] : Right channel check

Checking Method:

1) Input the 400Hz, –66dBs signal in the <right> [left] terminal of the MIC jack only.
2) Record in the camera mode.
3) Playback the recorded section.
4) Check that the signal level of the audio <left> [right] terminal is the specified value.

6-4. SERVICE MODE

4-1. ADJUSTMENT REMOTE COMMANDER

The adjustment remote commander is used for changing the calculation coefficient in signal processing, EVR data, etc. The adjustment remote commander performs bi-directional communication with the unit using the remote commander signal line (LANC). The resultant data of this bi-directional communication is written in the non-volatile memory.

1. Using the adjustment remote commander

1) Connect the adjustment remote commander to the LANC terminal.
2) Set the HOLD switch of the adjustment remote commander to "HOLD" (SERVICE position). If it has been properly connected, the LCD on the adjustment remote commander will display as shown in Fig. 6-4-1.

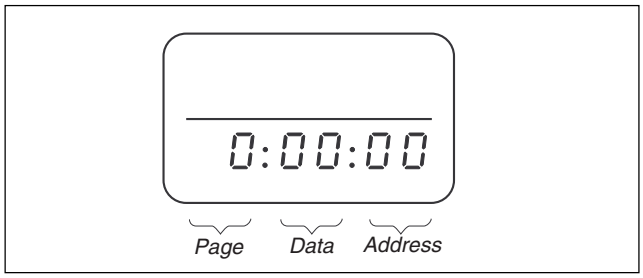


Fig. 6-4-1

3) Operate the adjustment remote commander as follows.
   - Changing the page
     The page increases when the EDIT SEARCH+ button is pressed, and decreases when the EDIT SEARCH– button is pressed. Page to use for the adjustment are 15 pages of 0 to 3, 6 to 8, A, C to F, 1C and 1F.

Hexadecimal notation	0 1 2 3 4 5 6 7 8 9 A B C D E F
LCD Display	0 1 2 3 4 5 6 7 8 9 A b c d E F
Decimal notation conversion value	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

   - Changing the address
     The address increases when the FF (►►) button is pressed, and decreases when the REW (◄◄) button is pressed. There are altogether 256 addresses, from 00 to FF.
   - Changing the data (Data setting)
     The data increases when the PLAY (►) button is pressed, and decreases when the STOP (■) button is pressed. There are altogether 256 data, from 00 to FF.
   - Writing the adjustment data
     The PAUSE button must be pressed to write the adjustment data (8, A, C, D, E, F, 1C, 1F page) in the nonvolatile memory. (The new adjusting data will not be recorded in the nonvolatile memory if this step is not performed.)
4) After completing all adjustments, turn off the main power supply once.

Note: When reading or writing the 1C, 1F page data, select page: 0, address: 10, and set data: 01, then select C or F page. The 1C or 1F page can be chosen by this data setting.
After reading or writing, reset the data of page: 0, address: 10 to "00".

2. Precautions upon using the adjustment remote commander

Mishandling of the adjustment remote commander may erase the correct adjustment data at times. To prevent this, it is recommended that all adjustment data be noted down before beginning adjustments and new adjustment data after each adjustment.

4-2. DATA PROCESS

The calculation of the DDS display and the adjustment remote commander display data (hexadecimal notation) are required for obtaining the adjustment data of some adjustment items. In this case, after converting the hexadecimal notation to decimal notation, calculate and convert the result to hexadecimal notation, and use it as the adjustment data. Indicates the hexadecimal-decimal conversion table.

Hexadecimal-decimal Conversion Table

	Lower digit of hexadecimal / Upper digit of hexadecimal	0	1	2	3	4	5	6	7	8	9	A (A)	B (b)	C (c)	D (d)	E (E)	F (F)
	0	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	1	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
	2	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
	3	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
	4	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79
	5	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
	6	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111
	7	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127
	8	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143
	9	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159
	A (A)	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175
①	B (b)	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191
	C (c)	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207
	D (d)	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223
	E (E)	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239
	F (F)	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255

② (above the table)

Note: The characters shown in the parenthesis ( ) shown the display on the adjustment remote commander.

(Example) If the DDS display or the adjustment remote commander shows BD (bd);
Because the upper digit of the adjustment number is B (b), and the lower digit is D (d), the meeting point "189" of ① and ② in the above table is the corresponding decimal number.

Table. 6-4-1.

4-3. SERVICE MODE

Note: Before performing the adjustments, check the data of page: 0, address: 10 is "00". If not, set data: 00 to this address.

1. Setting the Test Mode

Page D	Address 10

Data	Function
00	Normal
01	Forced camera power ON (CAMERA mode)
02	Forced VTR power ON (PLAY/EDIT mode)
03	Forced camera + VTR power ON

- Before setting the data , select page: 0, address: 01, and set data: 01.
- For page D, the data set is recorded in the non-volatile memory by pressing the PAUSE button of the adjustment remote commander. In this case, take note that the test mode will not be exited even when the main power is turned off.
- After completing adjustments/repairs, be sure to return the data of this address to 00, and press the PAUSE button of the adjustment remote commander.
  Select page: 0, address: 01, and set data: 00.

2. Emergence Memory Address (Camera section)

Page 1F	Address 5A to 5D

Note: When reading or writing the 1F page data, select page: 0, address: 10, and set data: 01, then select F page. The 1F page can be chosen by this data setting.
After reading or writing, reset the data of page: 0, address: 10 to "00".

2-1. EMG Code (Emergency Code)

Address	Contents
5A	EMG code when first error occurs
5B	EMG code when second error occurs
5C	EMG code when third error occurs
5D	EMG code when last error occurs

Codes corresponding to the errors which occur are written in 1F page, addresses 5A to 5D. The type of error indicated by the code are shown in the following table.

Code	Emergency Type
00	No error

Note: After completing adjustments, be sure to initialize the data of addresses 5A to 5D to "00".

Initializing method:

1) Select page: 0, address: 01, and set data: 01.
2) Select page: 0, address: 10, and set data: 00.
3) Select page: 6, address: 01, set data: FD and press the PAUSE button.
4) Check that the data of page: 6, address: 02 is "01".
5) Select page: 6, address: 01, set data: 00 and press the PAUSE button.
6) Select page: 0, address: 01, and set data: 00.

3. Emergence Memory Address (Mechanism section)

Page C	Address F4 to FF

Address	Contents
F4	EMG code when first error occurs
F6	Upper: MSW code when shift starts when first error occurs Lower: MSW code when first error occurs
F7	Lower: MSW code to be moved when first error occurs
F8	EMG code when second error occurs
FA	Upper: MSW code when shift starts when second error occurs Lower: MSW code when second error occurs
FB	Lower: MSW code to be moved when second error occurs
FC	EMG code when last error occurs
FE	Upper: MSW code when shift starts when last error occurs Lower: MSW code when last error occurs
FF	Lower: MSW code to be moved when last error occurs

When no error occurs in this unit, data "00" is written in the above addresses (F4 to FF). when first error occurs in the unit, the data corresponding to the error is written in the first emergency address (F4 to F7). In the same way, when the second error occurs, the data corresponding to the error is written in the second emergency address (F8 to FB). Finally, when the last error occurs, the data corresponding to the error is written in the last emergency address (FC to FF).

Note: After completing adjustments, be sure to initialize the data of addresses F4 to FF to "00".

Initializing method:

1) Select page: 0, address: 01, and set data: 01.
2) Select page: 3, address: 01, set data: 37, and press the PAUSE button.
3) Check that the data of page:3, address:02 is "00".
4) Select page: 0, address: 01, and set data: 00.

3-1. EMG Code (Emergency Code)

Codes corresponding to the errors which occur are written in addresses F4, F8 and FC. The type of error indicated by the code are shown in the following table.

Code	Emergency Type
00	No error
10	Loading motor emergency during loading
11	Loading motor emergency during unloading
22	T reel emergency during normal rotation
23	S reel emergency during normal rotation
24	T reel emergency (Short circuit between S reel terminal and T reel terminal)
30	FG emergency at the start up of the capstan
40	FG emergency at the start up of the drum
42	FG emergency during normal rotation of the drum

3-2. MSW Code

MSW when errors occur:

Information on MSW (mode SW) when errors occur

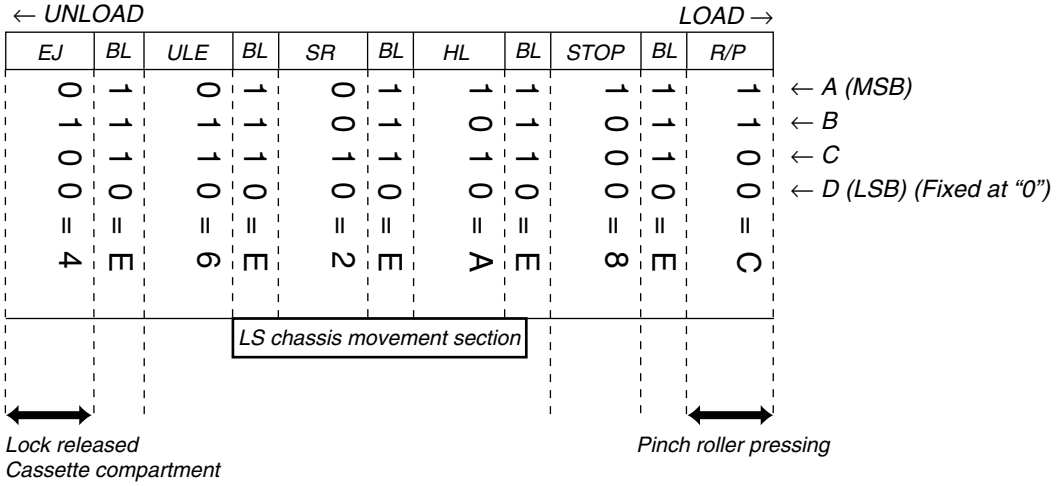
MSW when movement starts:

Information on MSW when movements starts when the mechanism position is moved (When the L motor is moved)

MSW of target of movement:

Information on target MSW of movement when the mechanism position is moved

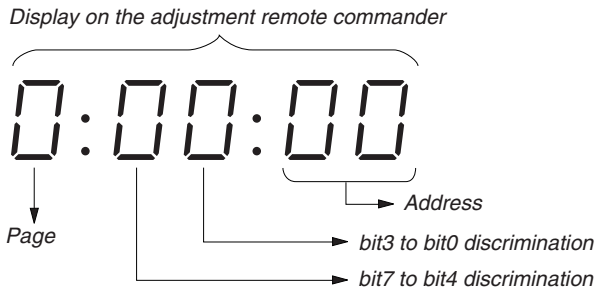
Mechanical Position



Position	Code	Contents
EJ	4	Position at which the cassette component lock is released, at the farthest unload side mechanically at which the mechanism can move no further in the UNLOAD direction.
BL	E	BLANK code, at the boundary between codes.
ULE	6	EJECT completion position. when the cassette is ejected, the mechanism will stop at this position. Cassette IN standby. The guide will start protruding out as the mechanism moves towards the LOAD position.
SR	2	Position at which it is possible to release the S ratchet.
HL	A	Guide loading are performed here.
STOP	8	Stop position in the loading state. The pinch roller separates, the tension regulator returns, and the brake is imposed on both reels.
R/P	C	PB, REC, CUE, REVIEW, PAUSE, FF, REW positions. When pinch roller is pressed, and the tension regulator is ON, the mechanism is operating at this position in modes in which normal images are shown.
NULL	0	Code not existing in the MD. Default value.
	F	Status before finding any mechanism position.

4. Bit value discrimination

Bit values must be discriminated using the display data of the adjustment remote commander for following items. Use the table below to discriminate if the bit value is "1" or "0".



	Display on the adjustment remote commander	Bit values			
		bit3 or bit7	bit2 or bit6	bit1 or bit5	bit0 or bit4
	0	0	0	0	0
	1	0	0	0	1
	2	0	0	1	0
	3	0	0	1	1
	4	0	1	0	0
	5	0	1	0	1
	6	0	1	1	0
	7	0	1	1	1
Ⓐ	8	1	0	0	0
	9	1	0	0	1
	A (R)	1	0	1	0
	B (b)	1	0	1	1
	C (c)	1	1	0	0
	D (d)	1	1	0	1
Ⓑ	E (E)	1	1	1	0
	F (F)	1	1	1	1

Example: If "8E" is displayed on the adjustment remote commander, the bit values for bit7 to bit4 are shown in the Ⓐ column, and the bit values for bit3 to bit0 are shown in the Ⓑ column.

5. Switch check (1)

Page 2	Address 81

Note: The data of page: 0, address: 10 must be "00".

Bit	Function	When bit value=1	When bit value=0
0	POWER SW (XPOWER SW) (SS6800 block)	ON	OFF
1	MODE SW (XMODE SW) (SS6800 block)	ON	OFF
2	DISPLAY/BATTERY INFO SW (XBATT INFO SW) (CR-047 board S802)	ON	OFF
3	EJECT SW (XEJECT SW) (SS6800 block S001)	ON	OFF
4	CC DOWN SW (Mechanism chassis)	ON(DOWN)	OFF (UP)

Using method:

1) Select page: 2, address: 81.
2) By discriminating the bit value of display data, the state of the switch can be discriminated.

6. Switch check (2)

Page 7	Address 08

Note: The data of page: 0, address: 10 must be "00".

Bit	Function	When bit value=1	When bit value=0
0	Lens shutter (FP-840 flexible S101)	Close	Open

Using method:

1) Select page: 7, address: 08.
2) By discriminating the bit value of display data, the state of the switch can be discriminated.

7. Switch check (3)

Page 7	Address 0C

Note: The data of page: 0, address: 10 must be "00".

Bit	Function	When bit value=1	When bit value=0
1	MIC jack (SE-401 board J401)	Used	Not used
2	A/V jack (FP-843 flexible J002)	Used	Not used
3	S VIDEO jack (Handycam station)	Used	Not used

Using method:

1) Select page: 7, address: 0C.
2) By discriminating the bit value of display data, the state of the switch can be discriminated.

8. Switch check (4)

Page 7	Address 53

Note: The data of page: 0, address: 10 must be “00”.

Bit	Function	When bit value=1	When bit value=0
5	A/V jack (Handycam station)	Used	Not used
6	Handycam station connector (CR-047 board CN801)	Not used	Used

Using method:

1) Select page: 7, address: 53.
2) By discriminating the bit value of display data, the state of the switch can be discriminated.

9. Switch check (5)

Page 7	Address 5C

Note: The data of page: 0, address: 10 must be “00”.

Bit	Function	When bit value=1	When bit value=0
3	REC PROOF SW (Mechanism chassis)	SAVE	REC

Using method:

1) Select page: 7, address: 5C.
2) By discriminating the bit value of display data, the state of the switch can be discriminated.

10. Switch check (6)

Page 2	Address 60 to 64

Note: The data of page: 0, address: 10 must be “00”.

Using method:

1) Select page: 2, address: 60 to 64.
2) By discriminating the display data, the pressed key can be discriminated.

Address	Data					
	00 (00 to 0C)	19 (0D to 24)	32 (25 to 3F)	4E (40 to 5D)	C1 (AB to D7)	EB (D8 to FF)
60 (KEY AD0) (IC8002 ⑲)	START/STOP (SS6800 block) (S002)					No key input
61 (KEY AD1) (IC8002 ⑳)	START/STOP (SB6300 block) (S001)		LCD BACK LIGHT ON/OFF (SB6300 block) (S002)			No key input
62 (KEY AD2) (IC8002 ㉑)	PHOTO (PHOTO REC) (ZM6800 block) (S002)			PHOTO (PHOTO FREEZE) (ZM6800 block) (S001)		No key input
63 (KEY AD3) (IC8002 ㉕)	EASY (CR-047 board) (S801)	PANEL CLOSE (FP-847 flexible) (S001)				PANEL OPEN (FP-847 flexible) (S001)
64 (KEY AD4) (IC8002 ㉖)	PANEL REVERSE (FP-926 flexible) (S101)					PANEL NORMAL (FP-926 flexible) (S101)
65 (KEY AD5) (IC8002 ㉗)	BACK LIGHT (SS6800 block) (S003)					

11. LED check

Page 7	Address 05

Note: The data of page: 0, address: 10 must be “00”.

Using method:

1) Select page: 7, address: 05, and set data: 20.
2) Check that the following LEDs are lit.
   TALLY, CHARGE, CAMERA, PLAY/EDIT, NIGHT SHOT light, EASY OPERATION
3) Select page: 7, address: 05, and set data: 00.

12. Record of Use check (1)

Page 7	Address A7 to A9

Note1: When replacing the drum assembly or the mechanism deck, initialize the data of address: A7 to A9.
Note2: This data will be kept even if the lithium battery (MS-201 board BT501) is removed.
Note3: The data of page: 0, address: 10 must be “00”.

Address	Function		Remarks
A7	Drum rotation	Hour (H)	100000th place digit and 10000th place digit of counted time
A8	counted time	Hour (M)	1000th place digit and 100th place digit of counted time
A9	(BCD code)	Hour (L)	10th place digit and 1st place digit of counted time

Using method:

1) The record of use data is displayed at addresses: A7 to A9.

Initializing method:

1) Select page: 7, address: 00, and set data: 71.
2) Select page: 7, address: 01, set data: 71 and press the PAUSE button.
3) Check that the data of page: 7, address: 02 is “01”.

13. Record of Use check (2)

Page 7	Address C8 to CD

Note1: This data will be kept even if the lithium battery (MS-201 board BT501) is removed.
Note2: The data of page: 0, address: 10 must be “00”.

Address	Function		Remarks
C8	User initial power	Year	After setting the clock, set the date of power on next
C9	on date	Month	
CA	(BCD code)	Day	
CB	Final condensation	Year	
CC	occurrence data	Month	
CD	(BCD code)	Day	

Using method:

1) The record of use data is displayed at addresses: C8 to CD.

14. Record of Self-diagnosis check

Page 7	Address B0 to C6

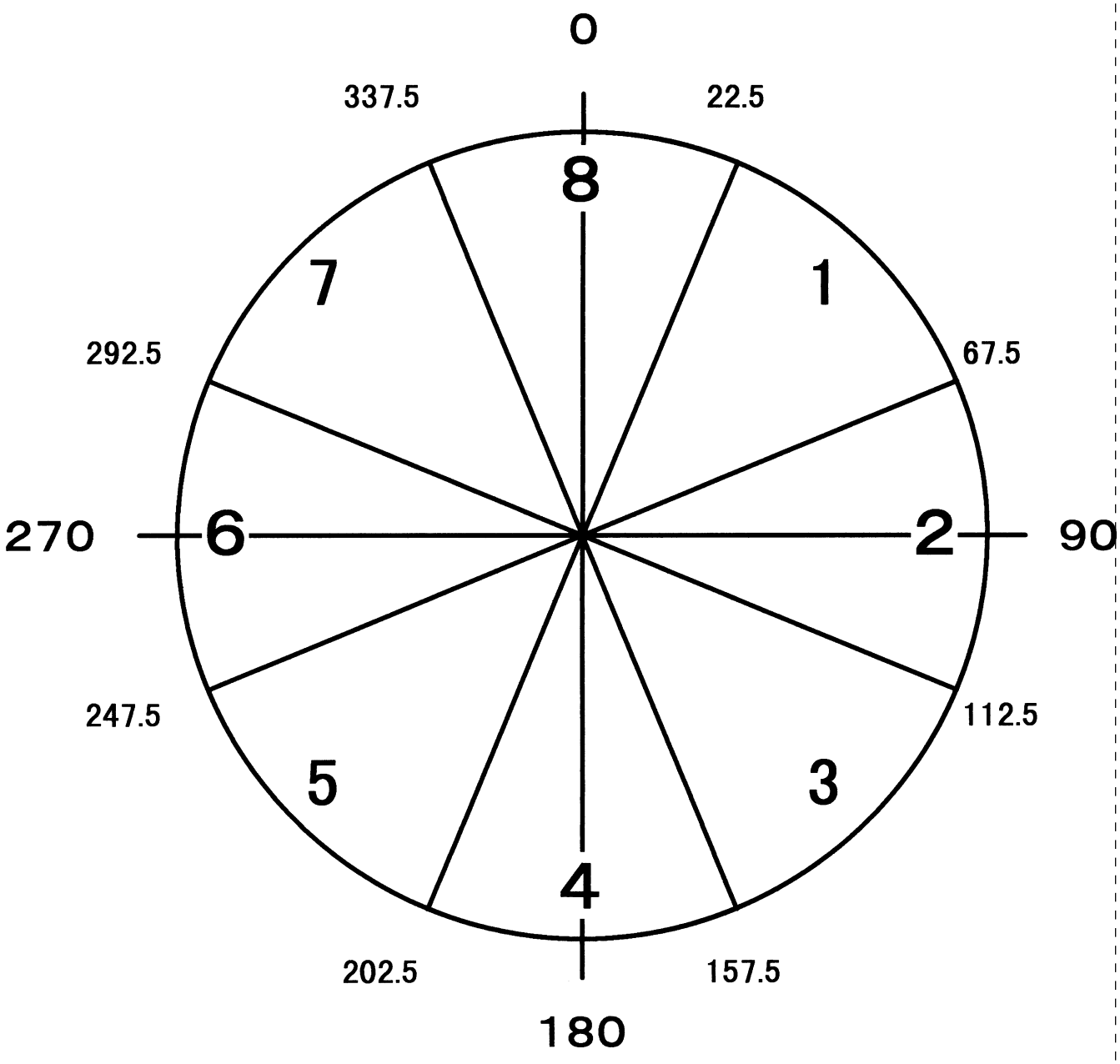
Note1: This data will be kept even if the lithium battery (MS-201 board BT501) is removed.
Note2: The data of page: 0, address: 10 must be “00”.

Address	Self-diagnosis code
B0	“Repaired by” code (Occurred 1st time) *1
B1	“Block function” code (Occurred 1st time)
B2	“Detailed” code (Occurred 1st time)
B4	“Repaired by” code (Occurred 2nd time) *1
B5	“Block function” code (Occurred 2nd time)
B6	“Detailed” code (Occurred 2nd time)
B8	“Repaired by” code (Occurred 3rd time) *1
B9	“Block function” code (Occurred 3rd time)
BA	“Detailed” code (Occurred 3rd time)
BC	“Repaired by” code (Occurred 4th time) *1
BD	“Block function” code (Occurred 4th time)
BE	“Detailed” code (Occurred 4th time)
C0	“Repaired by” code (Occurred 5th time) *1
C1	“Block function” code (Occurred 5th time)
C2	“Detailed” code (Occurred 5th time)
C4	“Repaired by” code (Occurred the last time) *1
C5	“Block function” code (Occurred the last time)
C6	“Detailed” code (Occurred the last time)

*1: “01” → “C”, “03” → “E”

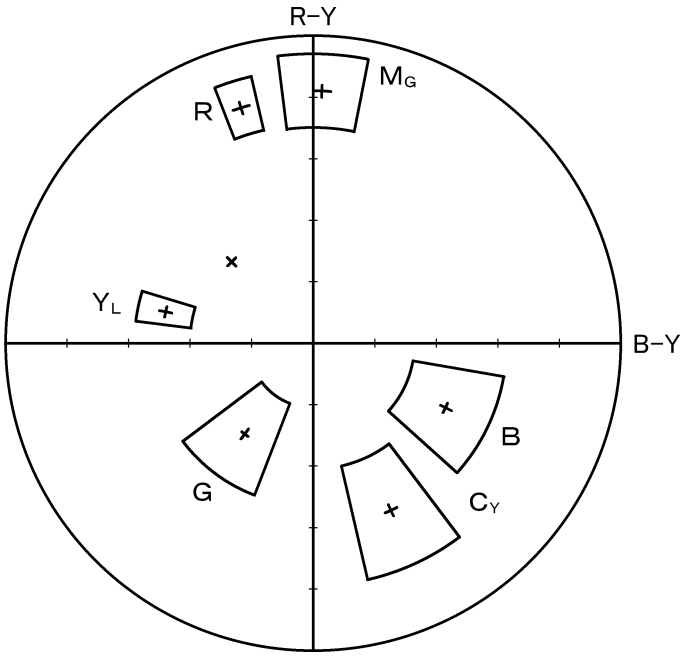
Using method:
1) The past self-diagnosis codes are displayed at addresses: BC to C6. Refer to the following table.

〈OPTICAL AXIS FRAME〉



Take a copy of OPTICAL AXIS FRAME with a clear sheet for use.

〈FOR CAMERA COLOR REPRODUCTION ADJUSTMENT〉



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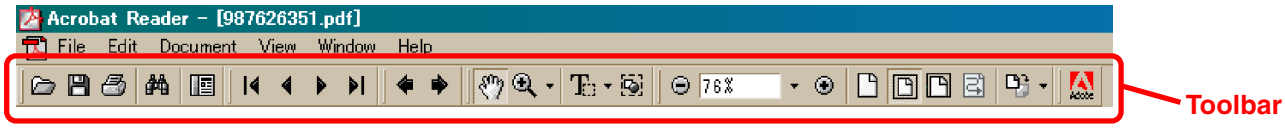
[Description of main button functions on toolbar of the Adobe Acrobat Reader Ver5.0 (for Windows)]



Printing a text

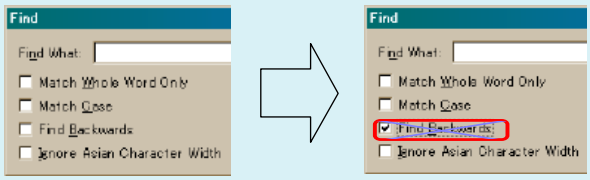
1. Click the Print button .
2. Specify a printer, print range, number of copies, and other options, and then click [OK].

Application of printing:
To set a range to be printed within a page, select the graphic selection tool and drag on the page to enclose a range to be printed, and then click the Print button.

Finding a text

1. Click the Find button .
2. Enter a character string to be found into a text box, and click the [Find]. (Specify the find options as necessary)

Application to the Service Manual:
To execute "find" from current page toward the previous pages, select the check box "Find Backward" and then click the "Find".



3. Open the find dialog box again, and click the [Find Again] and you can find the matched character strings displayed next. (Character strings entered previously are displayed as they are in the text box.)

Application to the Service Manual:
The parts on the drawing pages (block diagrams, circuit diagrams, printed circuit boards) and parts list pages in a text can be found using this find function. For example, find a Ref. No. of IC on the block diagram, and click the [Find Again] continuously, so that you can move to the Ref. No. of IC on the circuit diagram or printed circuit board diagram successively.
Note: The find function may not be applied to the Service Manual depending on the date of issue.

Switching a page

- To move to the first page, click the .
- To move to the last page, click the .
- To move to the previous page, click the .
- To move to the next page, click the .

Reversing the screens displayed once

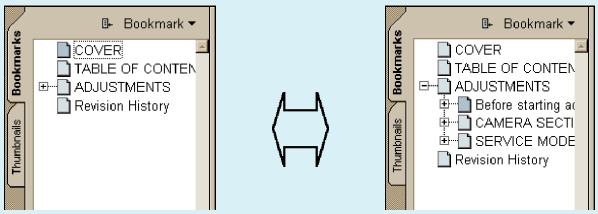
- To reverse the previous screens (operation) one by one, click the .
- To advance the reversed screens (operation) one by one, click the .

Application to the Service Manual:
This function allows you to go and back between circuit diagram and printed circuit board diagram, and accordingly it will be convenient for the voltage check.

Moving with link

1. Select either palm tool , zoom tool , text selection tool , or graphic selection tool .
2. Place the pointer in the position in a text where the link exists (such as a button on cover and the table of contents page, or blue characters on the removal flowchart page or drawing page), and the pointer will change to the forefinger form .
3. Then, click the link. (You will go to the link destination.)

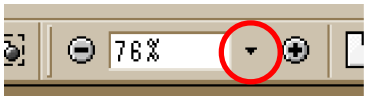
Moving with bookmark:
Click an item (text) on the bookmark pallet. and you can move to the link destination. Also, clicking can display the hidden items.
(To go back to original state, click)



Zooming or rotating the screen display

"Zoom in/out"

- Click the triangle button in the zoom control box to select the display magnification. Or, you may click or for zooming in or out.



"Rotate"

- Click rotate tool , and the page then rotates 90 degrees each.

Application to the Service Manual:
The printed circuit board diagram you see now can be changed to the same direction as the set.

Revision History

Ver.	Date	History	Contents	S.M. Rev. issued
1.0	2004.03	Official Release	—	—

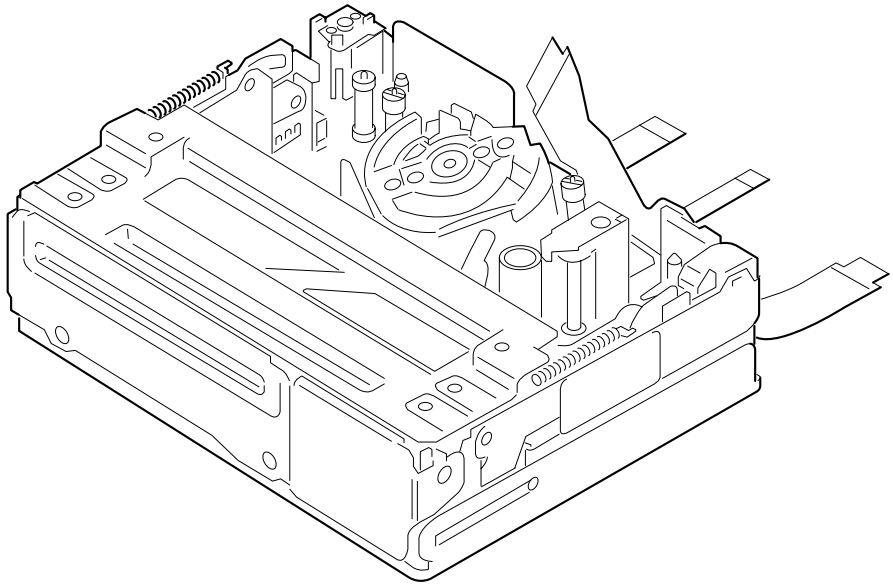
DV MECHANICAL ADJUSTMENT MANUAL VII

Ver 1.0 2003. 01

Z MECHANISM

Mini DV Digital Video Cassette

Please use this manual with the service manual of the respective models.



The capstan motor and the drum base block assy of this mechanism require very high precision work to install them in the mechanism. Therefore, the capstan motor and the drum base block assy are not supplied as the repair part independently. They are supplied as MD (Z100) SUB block assy.

Digital MECHANISM DECK

SONY

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1. Preparations for Check, Adjustment and Replacement of Mechanism Block

- Refer to the "DISASSEMBLY" section of the SERVICE MANUAL of the respective models for details of removing cabinets and printed wiring boards.
- When making any adjustment to a mechanism or replacing mechanical parts, be sure to use the Mode Selector II and select the appropriate status of the mechanical deck such that the mechanical status is suitable for the desired work. Refer to section "2-5. Mode Selector II" for details on how to enter the mode shown in a rectangle [____] mode in subsequent paragraphs of this manual.

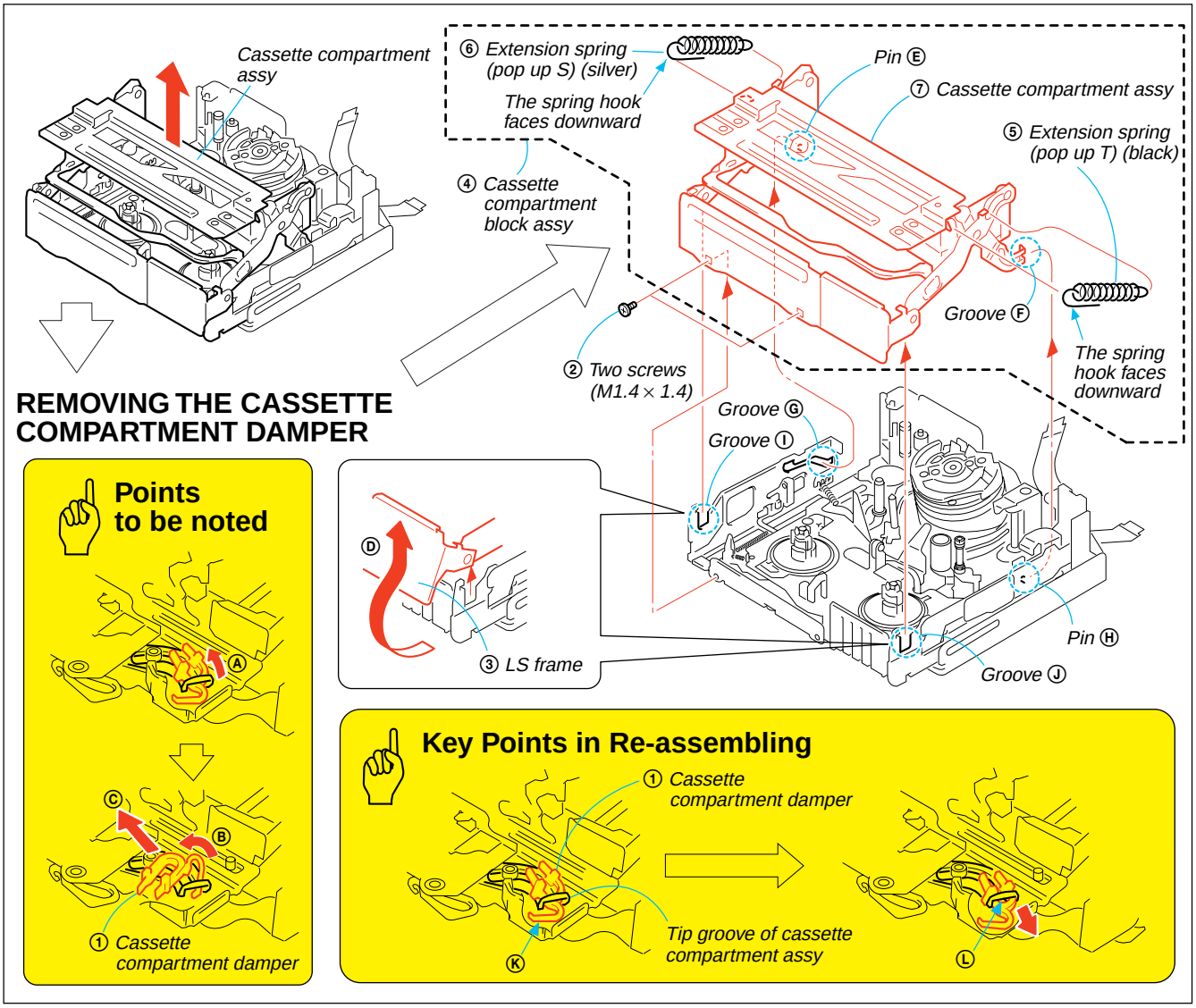
1-1. Cassette Compartment Assy, Damper Assy

1. Removal procedure

1) Set the [EJ] mode.
2) Press the cassette compartment down halfway. Pull the cassette compartment damper ① in the direction of the arrow Ⓐ. Then rotate it in the Ⓑ direction, and remove it in the direction of Ⓒ.
3) Remove the two screws (special head screw M1.4 × 1.4) ②.
4) Remove the LS chassis block assy ③ in the direction of the arrow Ⓓ.
5) Remove the pin Ⓔ and groove Ⓕ of the cassette compartment assy ④ from the LS chassis groove Ⓖ and pin Ⓗ. Then remove the cassette compartment block assy ④.
6) Remove the tension spring (POP UP T) (black) ⑤.
7) Remove the tension spring (POP UP S) (silver) ⑥.Then remove the cassette compartment assy ⑦.

2. Attachment procedure

1) Set the [ULE] mode.
2) Install the tension spring (cassette compartment S) (POP UP S) (silver) ⑥ in to the cassette compartment assy ⑦. (The spring should be hooked on the front stay with the spring end facing upward.)
3) Install the tension spring (cassette compartment T) (POP UP T) (black) ⑤ in to the cassette compartment assy ⑦. (The spring should be hooked on the front stay with the spring end facing upward.)
4) Install the pin Ⓔ and groove Ⓕ of the cassette compartment assy ④ into the LS chassis groove Ⓖ and pin Ⓗ.
5) In the status that the LS block assy ③ is kept open, insert it into the grooves Ⓘ and Ⓙ of the LS chassis block assy.
6) Close the LS chassis block assy ③ in the direction opposite to the arrow Ⓓ, and install it with the two screws (special head screw M1.4 × 1.4) ②.
   Tightening torque: 0.059 ± 0.01N•m (0.6 ± 0.1kgf•cm)
7) The cassette compartment down halfway. Pass the Ⓚ portion of the cassette compartment damper ① through the groove at the tip of the cassette compartment. Then pull the Ⓛ portion and fix it using tweezers or something.



2. Periodic Inspection and Maintenance

- Be sure to perform the following maintenance and inspection so that the machine delivers its full performance and functions, and to protect the machine and tape. Also, perform the following maintenance items after completing the repair work, regardless of the number of hours the machine has been operated by the user.

2-1. Rotary Drum Cleaning

1) Press a wiping cloth (Ref. No. J-2) moistened with cleaning fluid (Ref. No. J-1) lightly against the rotary drum. Rotate the upper drum with a super-fine applicator slowly in the counter-clockwise direction to clean the rotary drum.

Caution: Never rotate the rotary drum by turning on the main power of the motor or rotate it in the clockwise direction. Never move the cloth vertically against the head tip, as this will surely damage the video head; the video head must not be cleaned by any other different methods.

2-2. Tape Path System Cleaning (Refer to Fig. 2-1.)

1) Set the EJECT state. Clean the tape running path (TG-1, -2, -3, -4, -5, -6 and -7, pinch roller and capstan shaft) and lower drum with a super-fine applicator (Ref. J-3) moistened with cleaning fluid.

Note 1: Be careful not to allow oil or grease of the various link mechanisms to get on the super-fine applicator (Ref. J-3).
Note 2: Once the super-fine applicator has been moistened with alcohol, do not use it to clean other mechanical parts such as the tape guide. However, the pinch roller is cleaned with alcohol.
Note 3: When cleaning the capstan shaft, be carefull not to move the oil seal. If the oil seal is moved, oil will leak.

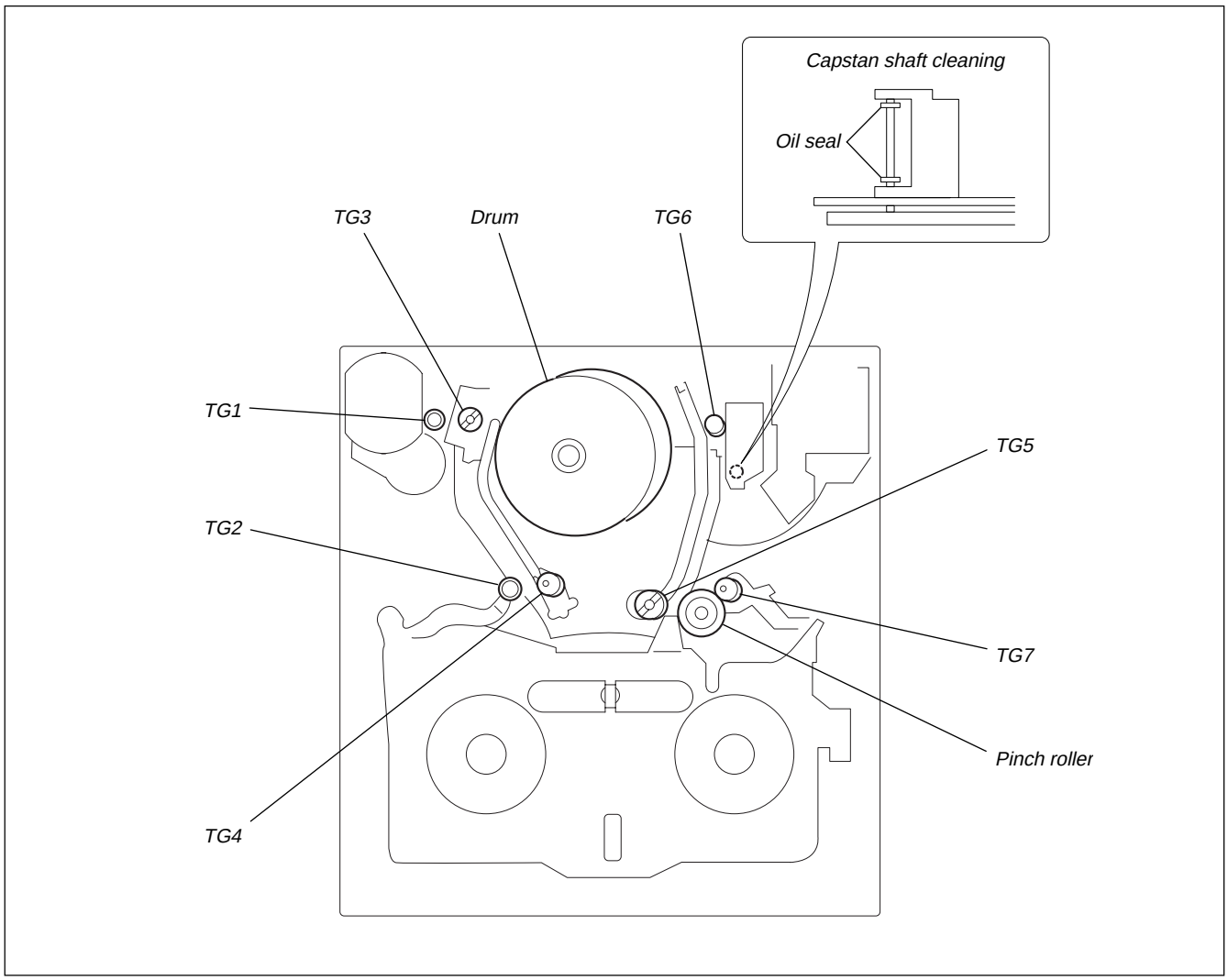


Fig. 2-1

2-3. Periodic Inspection List

Maintenance and inspection item		Operating hours (H)										Remarks
		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	
	Tape running surface cleaning	○	○	○	○	○	○	○	○	○	○	Be careful not to attach oil
	Rotary drum cleaning and degaussing	○	○	○	○	○	○	○	○	○	○	Be careful not to attach oil
Drive mechanism	Capstan bearing	—	☆	—	☆	—	☆	—	☆	—	☆	
Drive mechanism	Loading motor	—	☆	—	☆	—	☆	—	☆	—	☆	
Performance check	Abnormal sound	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	
Performance check	Back-tension measurement	—	☆	—	☆	—	☆	—	☆	—	☆	
Performance check	Brake system	—	☆	—	☆	—	☆	—	☆	—	☆	
Performance check	Brake system	—	☆	—	☆	—	☆	—	☆	—	☆	
Performance check	FWD/RVS torque measurement	—	☆	—	☆	—	☆	—	☆	—	☆	

○: Cleaning, ☆: Check

Note 1: When the machine is overhauled, replace the parts referring to the above list.

Note 2: Grease

- Be sure to use the specified grease only. (If grease of different viscosity is used, it can cause various troubles.)
- The grease must not contain any dust or other matter. (otherwise it can cause various trouble.)
- Observe the noted amount of grease. (otherwise the oozed grease can cause troubles.)
- Suncall FG-87HSR

2-4. Service Jigs and Tools

Ref. No.	Name	Part code	Jig inscription	Used for
J-1	Cleaning fluid	Y-2031-001-0		
J-2	Wiping cloth	7-741-900-53		
J-3	Super-fine applicator (made by Nippon Applicator (P752D))	—		
J-4	Mirror (small oval type)	J-6080-840-A	GD-2038	Tape path
J-5	Tracking tape (XH2-1) (NTSC, PAL)	8-967-997-01		Tape path
J-6	Mini DV torque cassette	J-6082-360-A		
J-7	FWD/BACK T adjustment screwdriver	J-6082-187-A		For TG2 FWD position adjustment
J-8	Torque screwdriver	J-9049-330-A		
J-9	Tape path screwdriver	J-6082-026-A		For tape path adjustment
J-10	Adjustment remote commander (RM-95 upgraded)	J-6082-053-B		
J-11	Mode Selector II	J-6082-282-B		General adjustment (ROM version 1.8)
J-12	Mode Selector II conversion board (Z)	J-6082-493-A		
J-13	Mode Selector II ROM (supporting Z mechanism) * Note 1	J-6082-314-G		ROM for Mode Selector II

Other required equipment: Oscilloscope

Note 1: This is the ROM used for upgrading the version of Mode Selector II to enable it to be used for the Z mechanism.

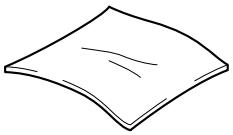
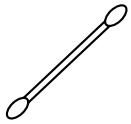
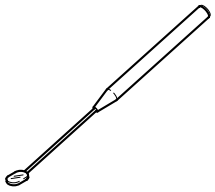
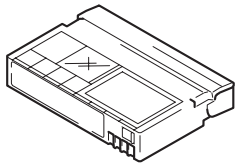
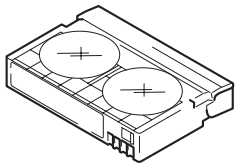
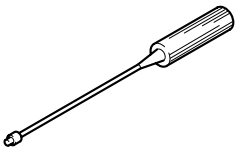
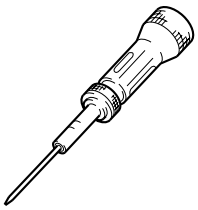
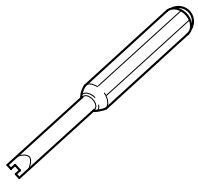
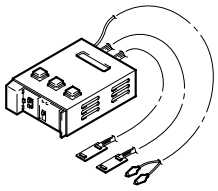
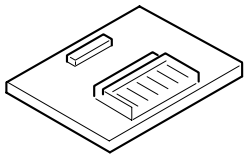
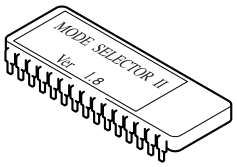
J-1	***J-2*** 	***J-3*** 	***J-4*** 	***J-5*** 
J-6 	***J-7*** 	***J-8*** 	***J-9*** 	***J-10***
J-11 	***J-12*** 	***J-13*** 		

Fig. 2-2

2-5. Mode Selector II Operating Procedure

2-5-1. Introduction

The Mode Selector II is a mechanism drive tool that assists maintenance work of the various mechanism decks. It has the following functions.

1. Manual Test

In this mode, the motor of the mechanism deck is powered only during the period while the switch is turned on manually. Using the Manual Test, the operator can freely control the motor of the mechanism deck.

2. Step Test

In this mode, the motor of the mechanism deck is kept turned on until the mechanical status is changed from the present mechanical status that is obtained from the sensor information. The Step Test is used to confirm a series of movements of the mechanism deck.

3. Auto Test

The Mode Selector II stores the status transition table in its memory as data indicating the respective modes of the mechanism deck. The status transition table can be used to confirm whether a mechanism deck is operating normally or has abnormality from a series of movements of a mechanism deck. If an abnormal status transition is detected during operation, the "NG" indication appears and the mechanism stops moving.

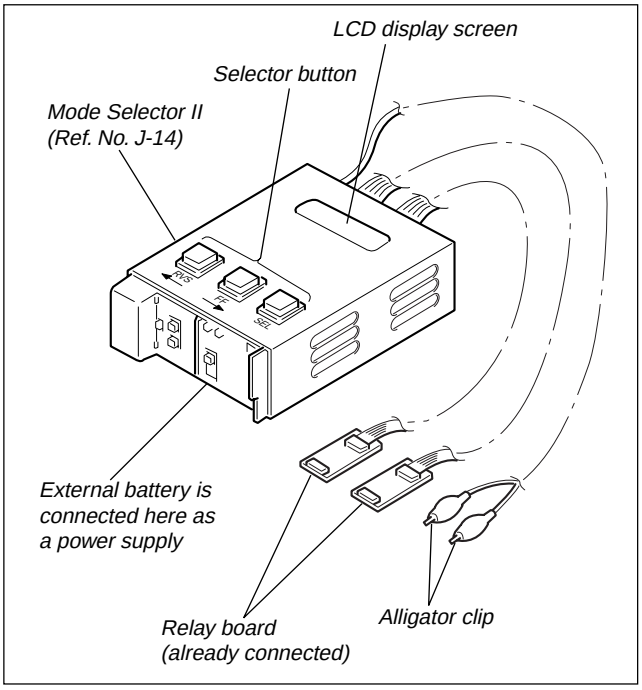


Fig. 2-3

Mode Selector II (J-6082-282-B) connection diagram

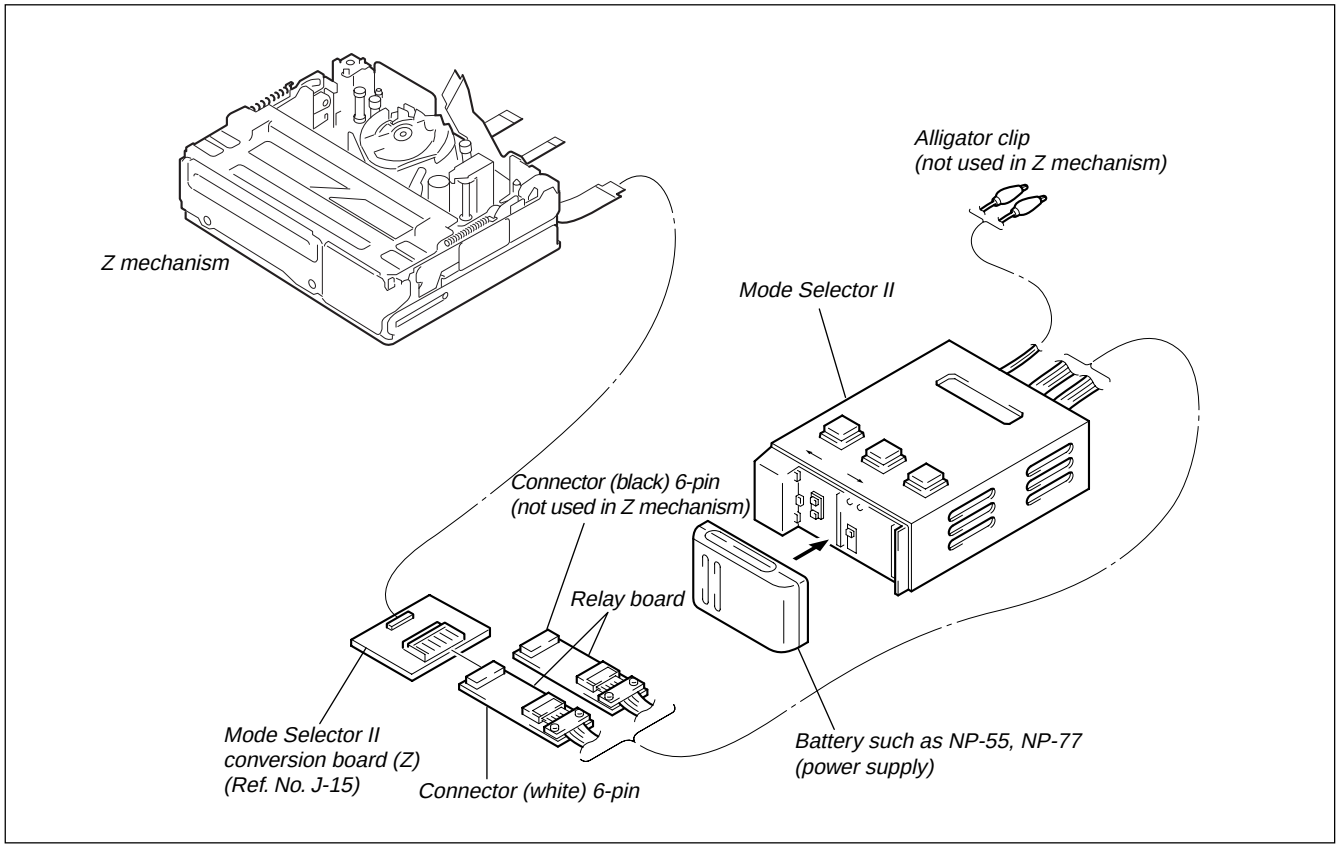
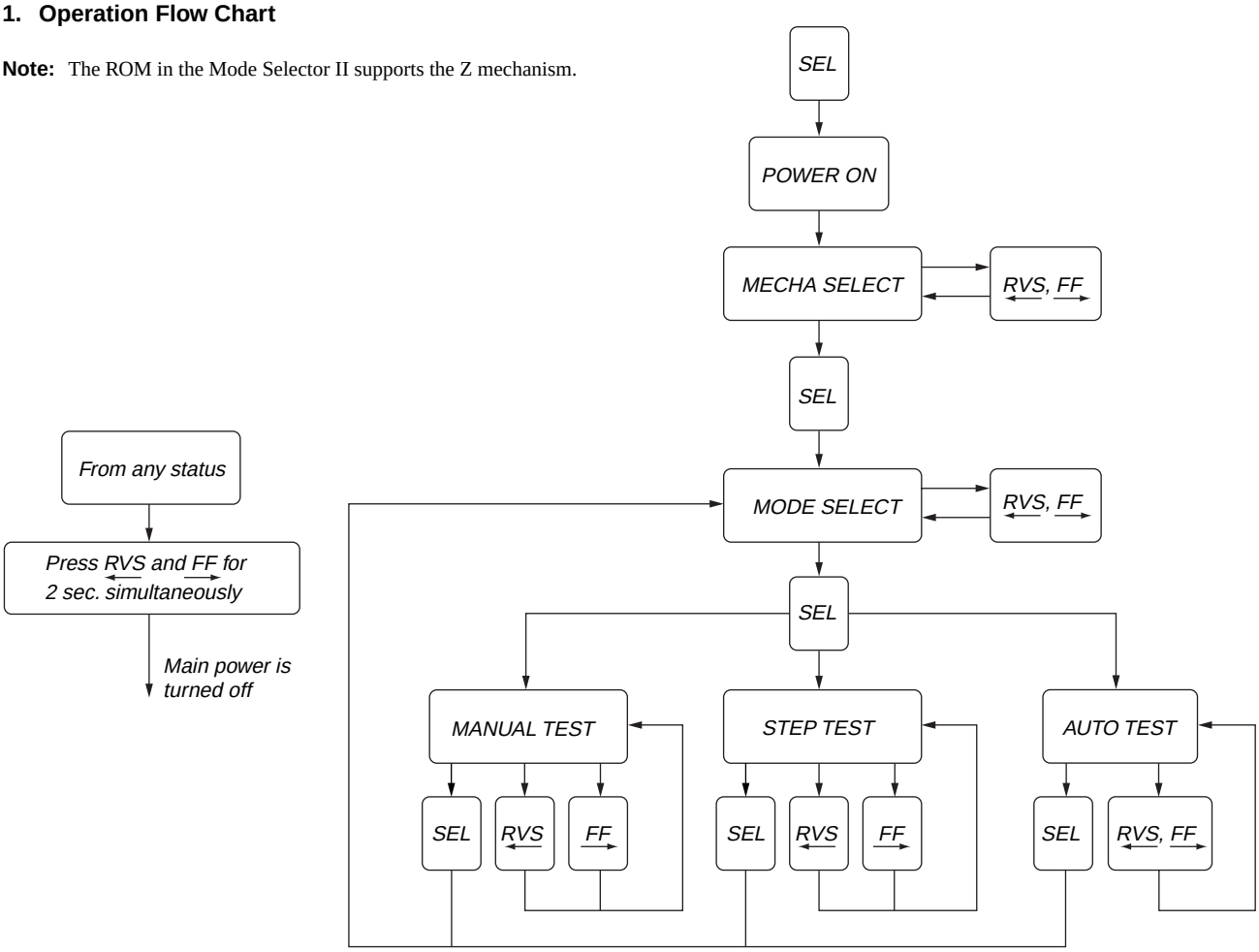


Fig. 2-4

2-5-2. Operation

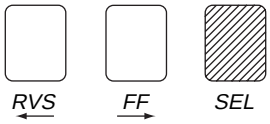
1. Operation Flow Chart

Note: The ROM in the Mode Selector II supports the Z mechanism.



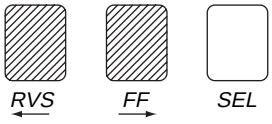
2. Mode Selector II Power On

Turn on the main power of the Mode Selector II as follows.
Press the SEL button.



3. Mode Selector II Power Off

Turn off the main power of the Mode Selector II as follows.
Press the RVS and FF buttons at the same time for 2 seconds or longer while the power is on.



4. Mecha Select

When the main power is turned on, the MECHA SELECT display appears on the LCD screen. Select the desired mechanism name using the RVS and FF buttons. Selection is complete when the SEL button is pressed. (Fig. A shows the Z mechanism.)

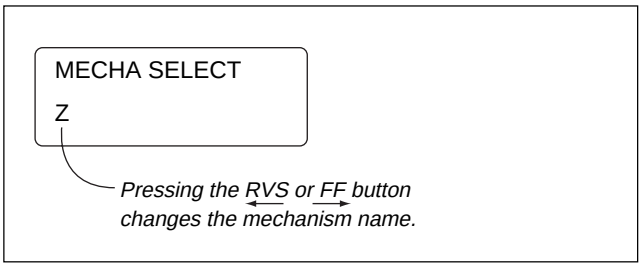


Fig. a

5. Test Type Select

Using the RVS and FF buttons, select a desired test type from the three types of "MANUAL", "STEP" and "AUTO". Selection is complete when the SEL button is pressed.

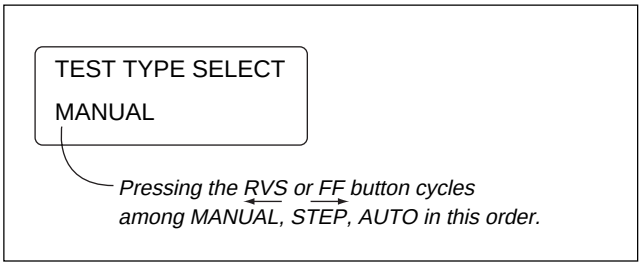


Fig. b

6. Manual Test

In this test, the motor of the mechanism deck is turned on only during the period while the RVS or FF button is pressed manually.

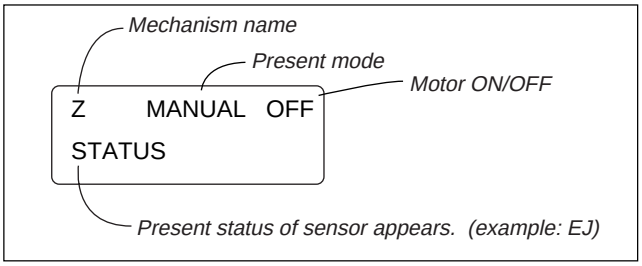


Fig. c

7. Step Test

In this test, the direction of motor movement is determined by the RVS and FF buttons. The motor of the mechanism deck is kept turned on until the mechanical status is changed from the present mechanical status that is obtained from the sensor information.

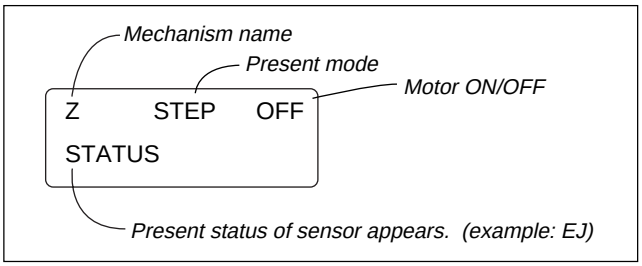


Fig. d

8. Auto Test

In this test, the mechanism deck is tested as to whether it performs a series of movements correctly in accordance with the operation sequence that is memorized earlier for each type of deck, by checking the output signals from sensors with the stored memory. Turning on the RVS or FF button performs the same operation.

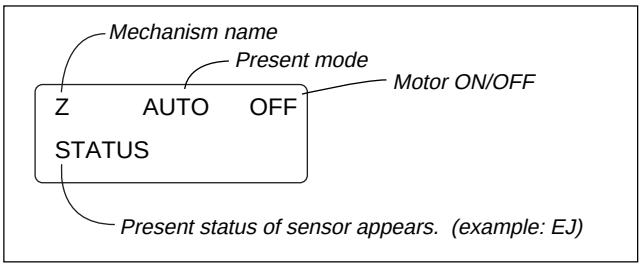


Fig. e

2-5-3. Mechanism Status (Position) Transition Table Using Mode Selector II

After selecting a mechanism deck, select either the MANUAL or STEP test (not AUTO) using the Mode Selector II. The desired mechanism status (position) can be specified by pressing the RVS or FF button. (The selected status appears on STATUS.)
EJ⟷ULE⟷SR⟷HL⟷STOP⟷R/P

MD name / Code				Z Mechanism
A	B	C		
0	1	0	1	EJ
1	1	0	2	ULE
1	0	0	3	SR
1	0	1	4	HL
0	0	1	5	STOP
0	1	1	6	R/P

2-5-4. Battery Alarm Indication

When the level of the battery used to supply power to this system decreases, this display appears asynchronously. When this happens, all operations are disabled and the battery must be replaced.

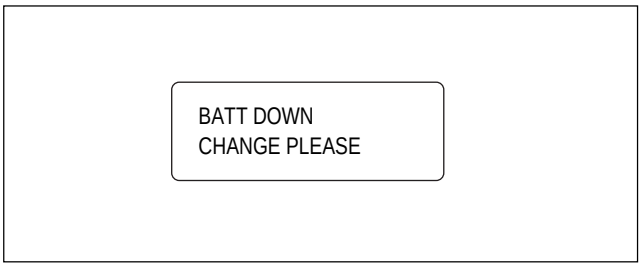
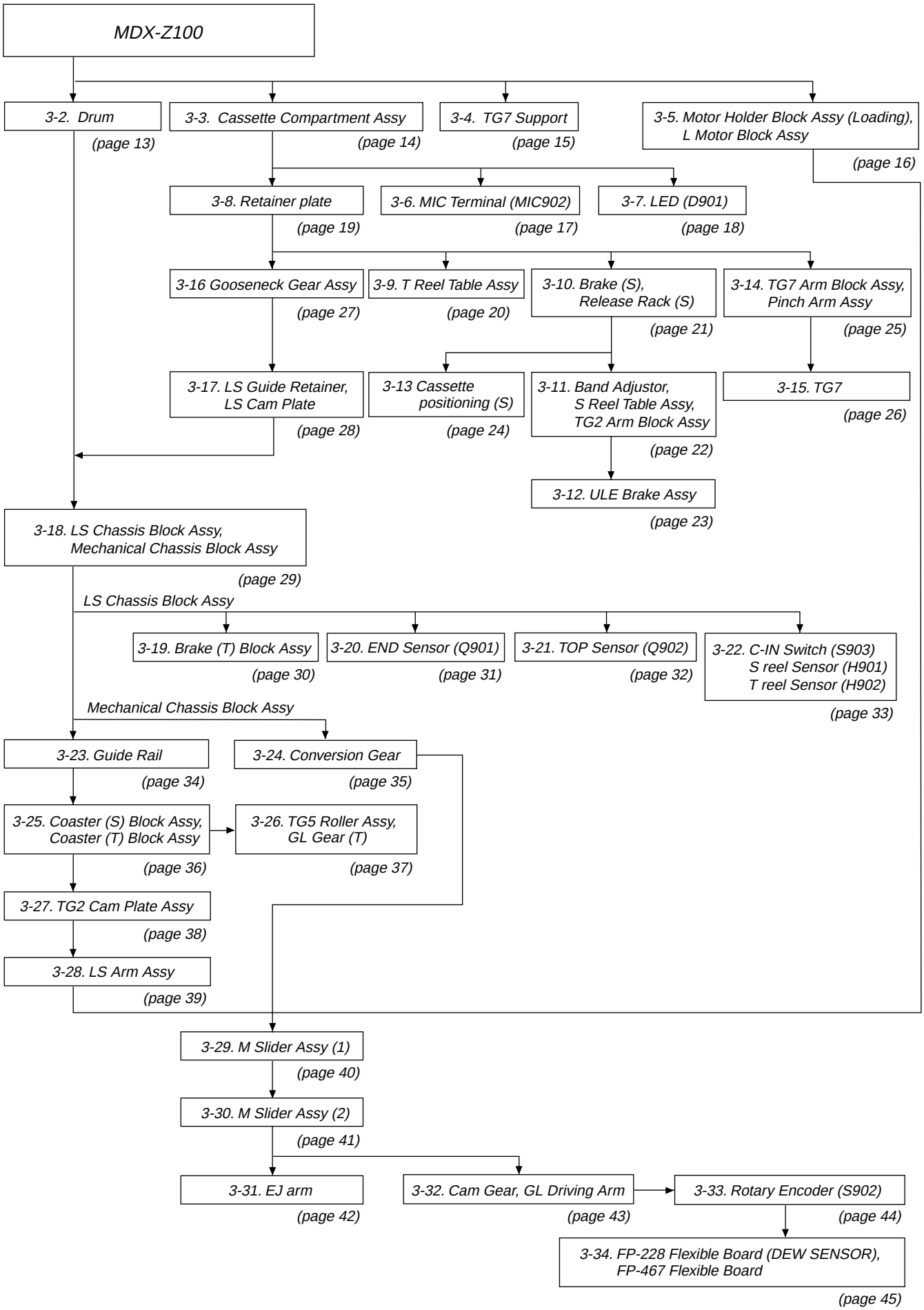


Fig. f

3. Check, Adjustment and Replacement of Mechanical Parts

3-1. Flowchart of Replacement of Mechanical Parts



3-2. Drum

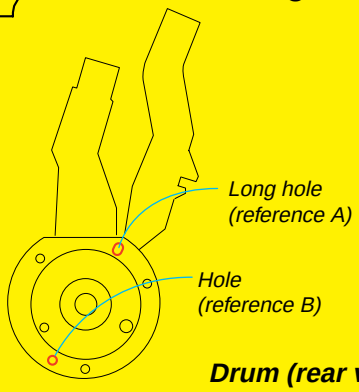
1. Removal procedure

1) Remove head drum flexible board Ⓒ from the notch of the mechanical chassis block assy.
2) Remove the drum fixing screw (M1.4 × 1.3) ① and remove the drum assy ②.

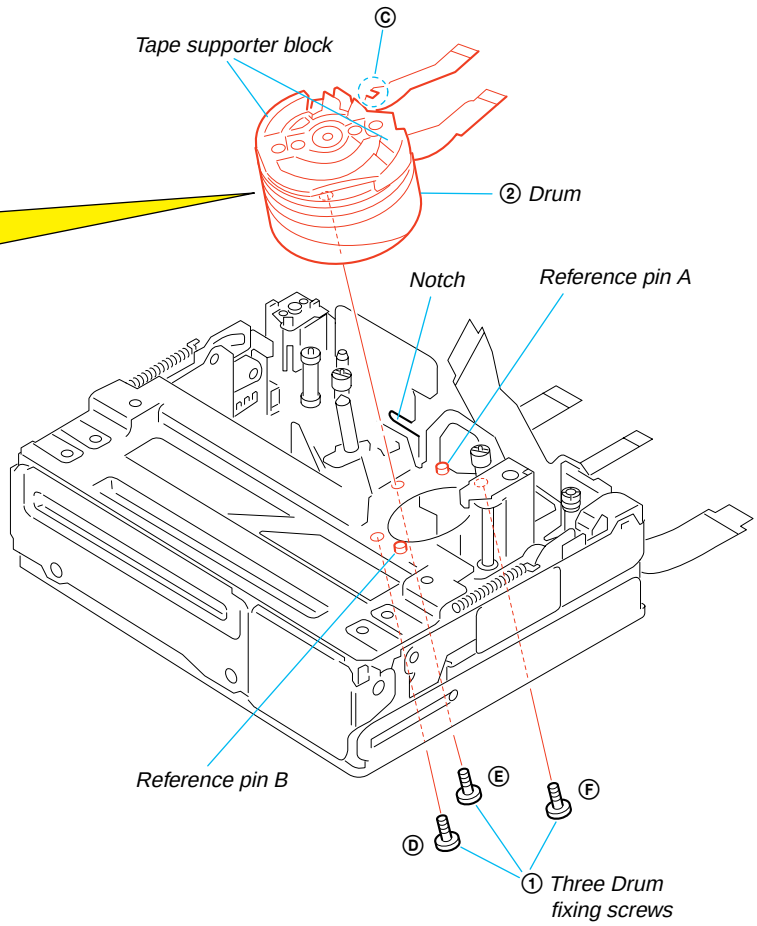
2. Attachment procedure

1) Ensure that head drum fixible board is hooked on the tape supporter block.
2) Hold the tape-supporter block of the drum ② and insert the drum flexible board into the mechanical chassis block assy.
3) Insert the two reference holes A and B of the drum into the reference pins A and B of the drum base assy.
4) Hook the flexible board Ⓒ portion on the notch.
5) Install the three drum fixing screws (M1.4 × 1.3) ① in the order starting from Ⓓ, then Ⓔ, and finally Ⓕ. Then tighten the screws.
   Tightening torque: 0.059 ± 0.01N•m (0.6 ± 0.1kgf•cm)
   Return Ⓔ 120°, then apply the screw locking paint (Neji lock).
6) Clean the drum by referring to section2-1.
7) Perform the tape path adjustment. (Refer to “4-4. Tape Path Adjustment”.)

Key Points in Re-assembling

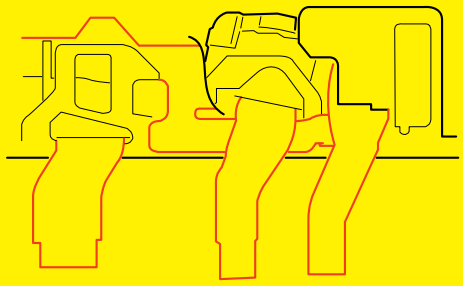


Drum (rear view)



Drum Flexible Board Processing

Key Points in Re-assembling



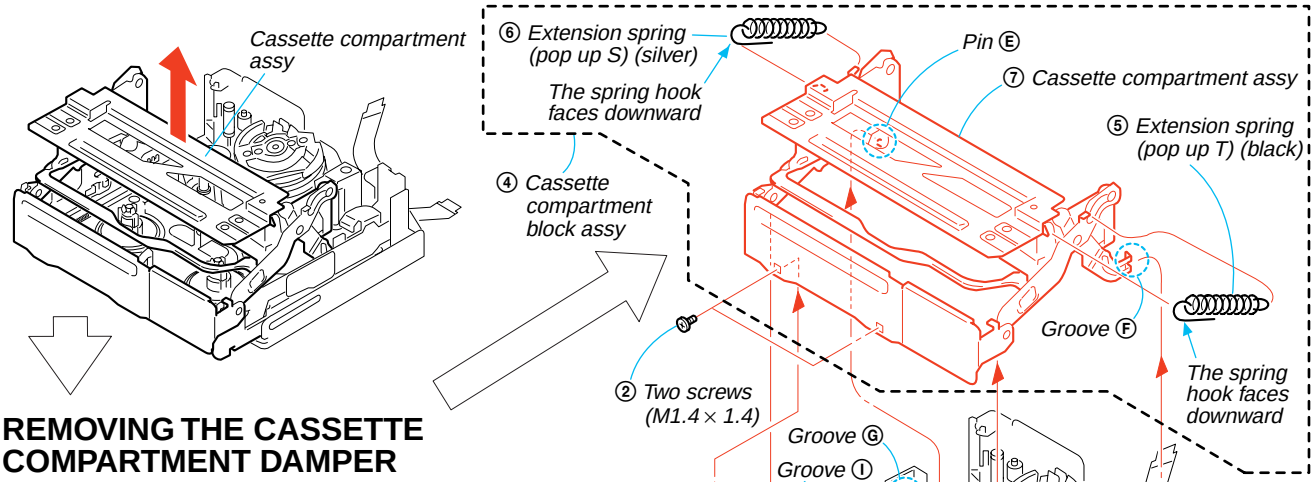
3-3. Cassette Compartment Assy

1. Removal procedure

1) Set the [EJ] mode.
2) Press the cassette compartment down halfway. Pull the cassette compartment damper ① in the direction of the arrow Ⓐ. Then rotate it in the Ⓑ direction, and remove it in the direction of Ⓒ.
3) Remove the two screws (special head screw M1.4 × 1.4) ②.
4) Remove the LS chassis block assy ③ in the direction of the arrow Ⓓ.
5) Remove the pin Ⓔ and groove Ⓕ of the cassette compartment assy ④ from the LS chassis groove Ⓖ and pin Ⓗ. Then remove the cassette compartment block assy ④.
6) Remove the tension spring (POP UP T) (black) ⑤.
7) Remove the tension spring (POP UP S) (silver) ⑥.Then remove the cassette compartment assy ⑦.

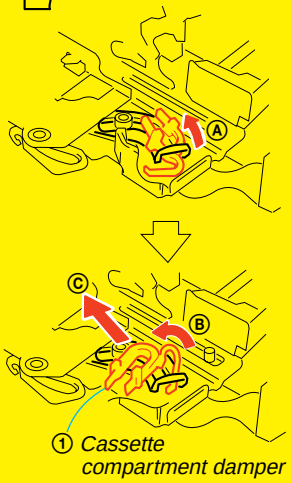
2. Attachment procedure

1) Set the [ULE] mode.
2) Install the tension spring (cassette compartment S) (POP UP S) (silver) ⑥ in to the cassette compartment assy ⑦. (The spring should be hooked on the front stay with the spring end facing upward.)
3) Install the tension spring (cassette compartment T) (POP UP T) (black) ⑤ in to the cassette compartment assy ⑦. (The spring should be hooked on the front stay with the spring end facing upward.)
4) Install the pin Ⓔ and groove Ⓕ of the cassette compartment assy ④ into the LS chassis groove Ⓖ and pin Ⓗ.
5) In the status that the LS block assy ③ is kept open, insert it into the grooves Ⓘ and Ⓙ of the LS chassis block assy.
6) Close the LS chassis block assy ③ in the direction opposite to the arrow Ⓓ, and install it with the two screws (special head screw M1.4 × 1.4) ②.
   Tightening torque: 0.059 ± 0.01N•m (0.6 ± 0.1kgf•cm)
7) The cassette compartment down halfway. Pass the Ⓚ portion of the cassette compartment damper ① through the groove at the tip of the cassette compartment. Then pull the Ⓛ portion and fix it using tweezers or something.

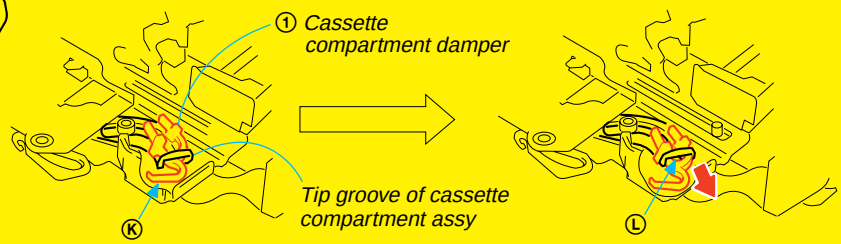


REMOVING THE CASSETTE COMPARTMENT DAMPER

Points to be noted



Key Points in Re-assembling



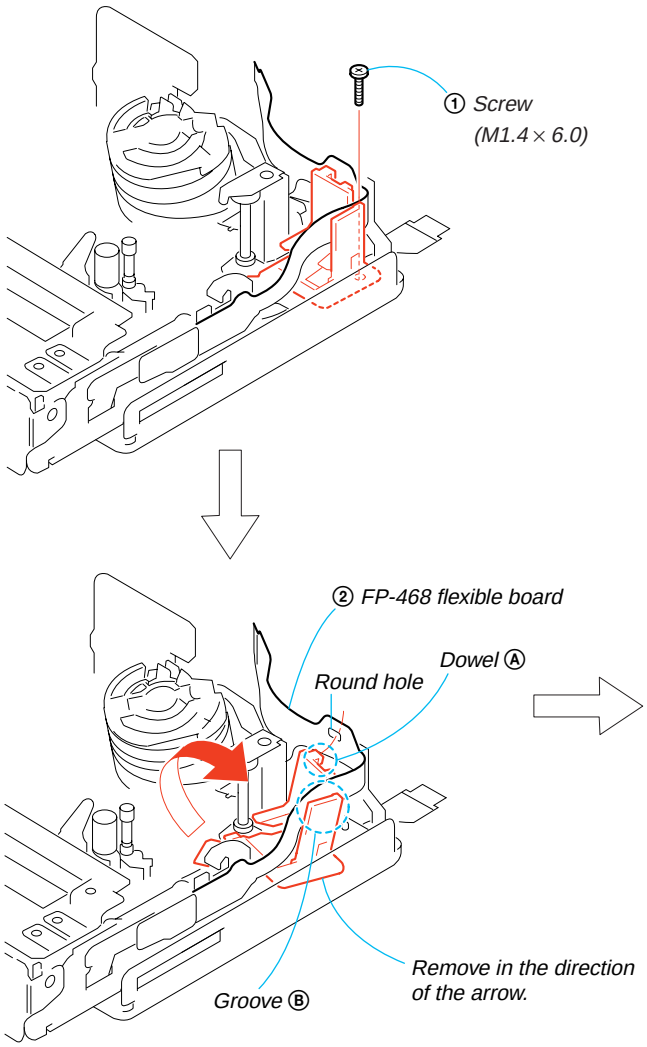
3-4. TG7 Support

1. Removal procedure

1) Remove the screw (special head screw M1.4 × 6.0) ①.
2) Remove the FP-468 flexible board ② from the dowel Ⓐ of the TG7 support.
3) Remove the FP-468 flexible board ② from the groove Ⓑ of the TG7 support.
4) Remove the TG7 support ③ in the direction of the arrow.

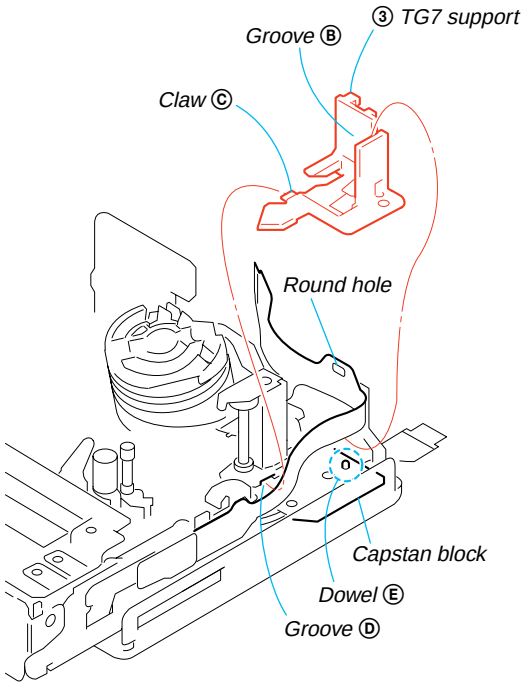
2. Attachment procedure

1) Install the FP-468 flexible board ② into the groove Ⓑ of TG7 support ③.
2) Insert the claw Ⓒ of the TG7 support ③ into the groove Ⓓ of the capstan block, and fix it while aligning with the dowel Ⓔ.
3) Align the round hole of the FP-468 flexible board ② with the dowel Ⓐ of the TG7 support ③.
4) Install the screw (special head screw M1.4 × 6.0) ①.
Tightening torque: 0.059 ± 0.01N•m (0.6 ± 0.1kgf•cm)



Points to be noted

• Be careful not to damage the FP-468 flexible board.



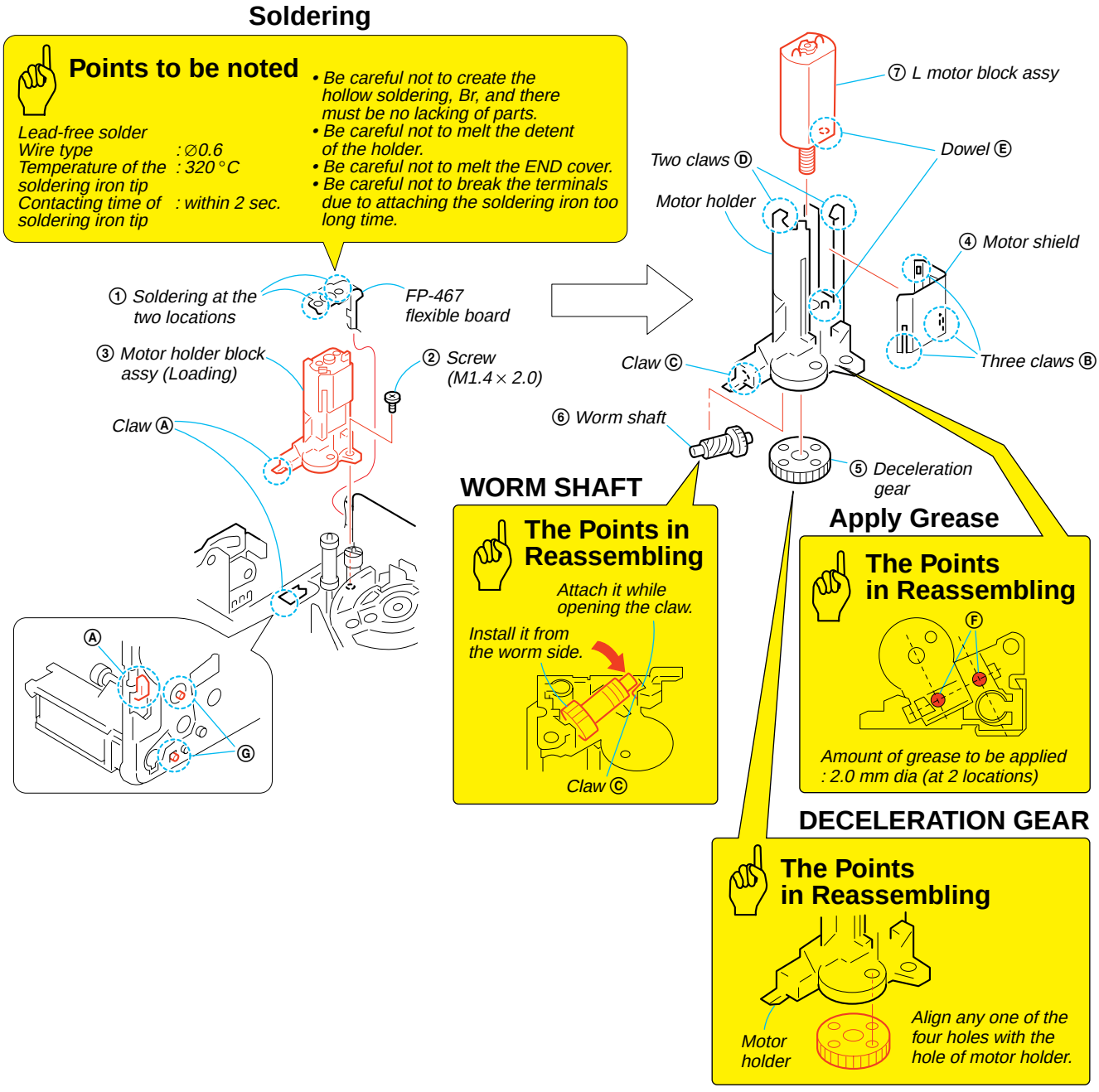
3-5. Motor Holder Block Assy and L Motor Block Assy

1. Removal procedure

1) Remove soldering at the two locations ①, and remove the FP-467 flexible board from the motor holder block assy (loading) ③.
2) Remove the screw (special head screw M1.4 × 2.0) ②.
3) Remove the motor holder block assy (loading) ③ by pulling it off from the claw Ⓐ.
4) Release the three claws Ⓑ and remove the motor shield ④.
5) Remove the deceleration gear ⑤.
6) Release the claw Ⓒ and remove the worm shaft ⑥.
7) Release the two claws Ⓓ and remove the L motor block assy ⑦ from the motor holder.

2. Attachment procedure

1) Confirm the direction of the L motor block assy ⑦. Align the dowels Ⓔ then install into the motor holder. (Insert the motor worm so that the motor worm does not touch the motor holder, and fix it with two claws Ⓓ.
2) Engage the three claws Ⓑ and install the motor shield.
3) Apply 2.0 g of grease (at 2 locations) to the bottom Ⓕ of the motor holder.
4) Install the worm shaft ⑥ from the worm side and set the claw.
5) Install the reduction gear ⑤.
6) Engage the claw Ⓐ and align the two dowels Ⓖ. Then install the motor holder block assy (loading) ③ in the mechanical chassis block. Install the screw (special head screw M1.4 × 2.0) ②.
   Tightening torque: 0.059 ± 0.01N•m (0.6 ± 0.1kgf•cm)
7) Make soldering at the two locations ①. Install the motor holder block assy (loading) ③ into the FP-467 flexible board ④.


Soldering
Points to be noted
Lead-free solder
Wire type : ∅0.6
Temperature of the soldering iron tip : 320 °C
Contacting time of soldering iron tip : within 2 sec.
• Be careful not to create the hollow soldering, Br, and there must be no lacking of parts.
• Be careful not to melt the detent of the holder.
• Be careful not to melt the END cover.
• Be careful not to break the terminals due to attaching the soldering iron too long time.
① Soldering at the two locations
FP-467 flexible board
③ Motor holder block assy (Loading)
② Screw (M1.4 × 2.0)
Claw Ⓐ
Ⓐ
Ⓖ
⑦ L motor block assy
Two claws Ⓓ
Dowel Ⓔ
Motor holder
④ Motor shield
Three claws Ⓑ
Claw Ⓒ
⑥ Worm shaft
⑤ Deceleration gear
WORM SHAFT
The Points in Reassembling
Attach it while opening the claw.
Install it from the worm side.
Claw Ⓒ
Apply Grease
The Points in Reassembling
Ⓕ
Amount of grease to be applied : 2.0 mm dia (at 2 locations)
DECELERATION GEAR
The Points in Reassembling
Motor holder
Align any one of the four holes with the hole of motor holder.

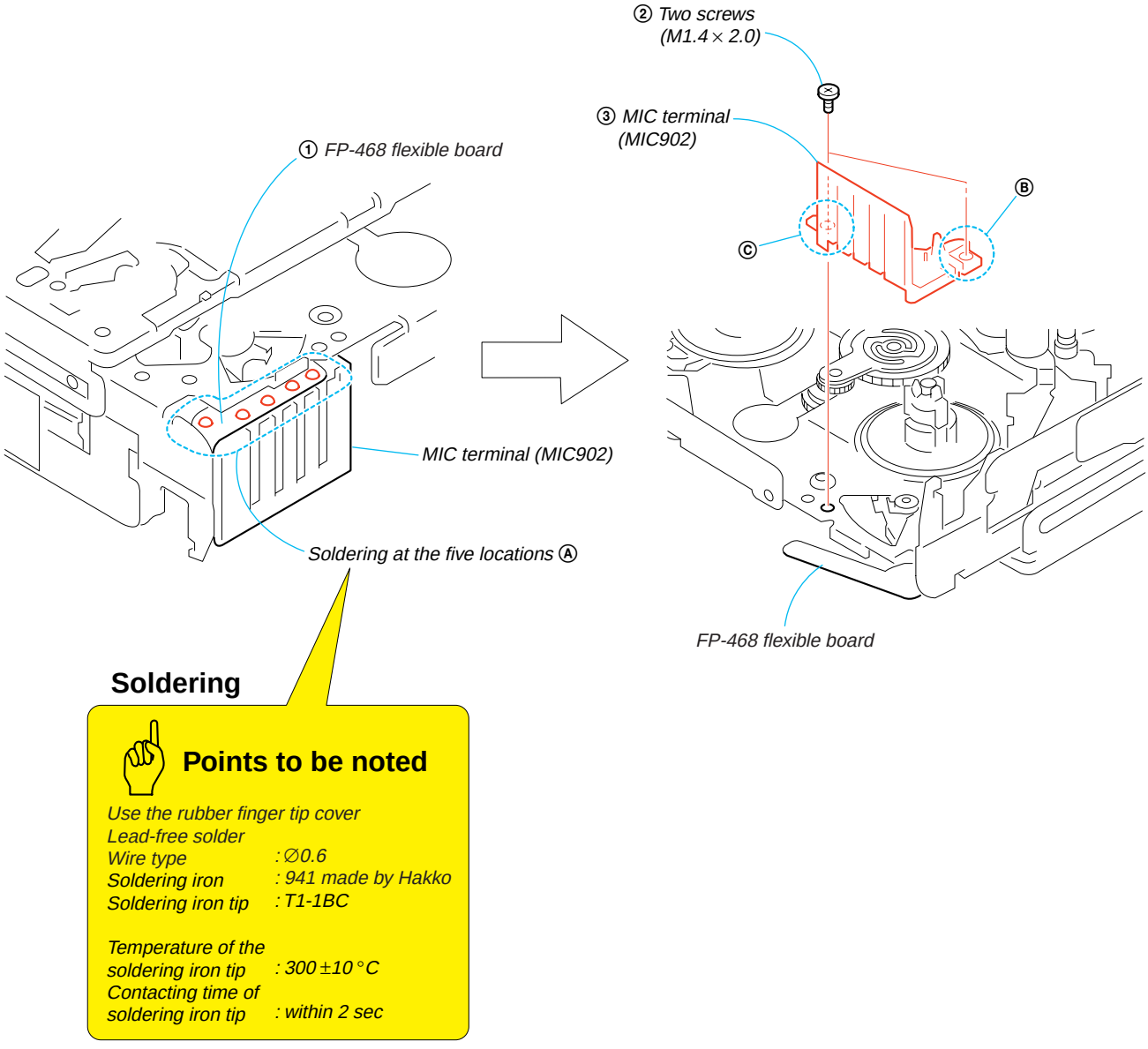
3-6. MIC Terminal (MIC902)

1. Removal procedure

1) Remove soldering at the five locations Ⓐ, and remove the FP-467 flexible board ① from the MIC terminal (MIC902) ③.
2) Remove the screw (special head screw M1.4 × 2.0) ② and remove the MIC terminal (MIC902) ③.

2. Attachment procedure

1) While pressing the top of the MIC terminal (MIC902) ③, tighten the two screws (special head screw M1.4 × 2.0) ② in the order of Ⓑ then Ⓒ.
   Tightening torque: 0.059 ± 0.01N•m (0.6 ± 0.1kgf•cm)
2) Make soldering at the five locations Ⓐ, and connect the FP-468 flexible board ① into the MIC terminal (MIC902) .



Soldering

Points to be noted

Use the rubber finger tip cover
Lead-free solder

Wire type	*: ∅0.6*
Soldering iron	*: 941 made by Hakko*
Soldering iron tip	*: T1-1BC*
Temperature of the soldering iron tip	*: 300 ±10 °C*
Contacting time of soldering iron tip	*: within 2 sec*

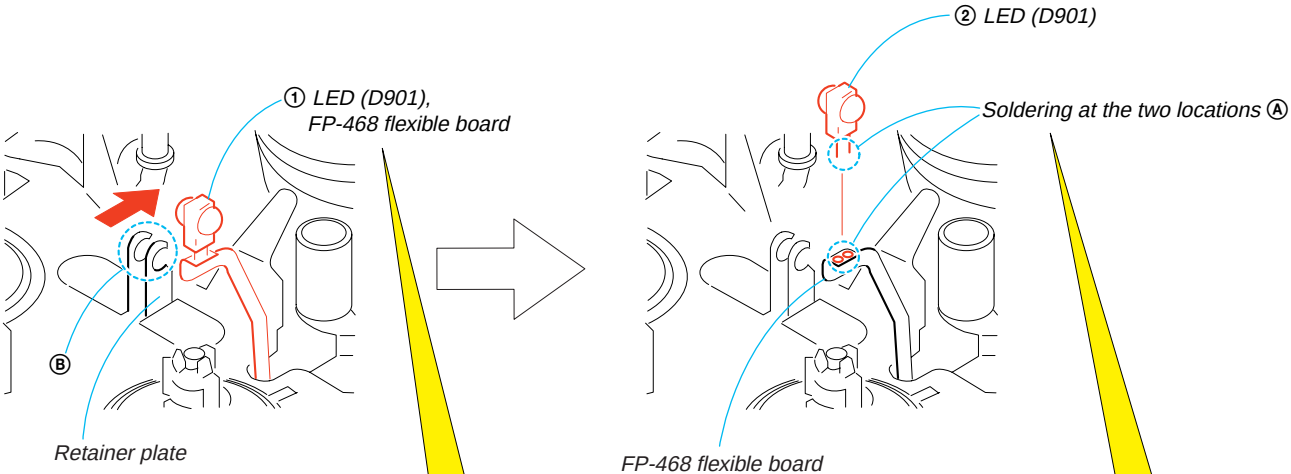
3-7. LED (D901)

1. Removal procedure

1) Remove LED (D901) and the FP-468 flexible board ① from the retainer plate.
2) Remove soldering at the two locations Ⓐ and remove LED (D901) ②.

2. Attachment procedure

1) Install the LED (D901) ② to the FP-468 flexible board by making soldering at the two locations Ⓐ.
2) Fold the FP-468 flexible board ① beneath the LED (D901) with finger tip so that it is inserted into the Ⓑ portion of the retainer plate.



LED (D901), FP-468 FLEXIBLE BOARD

Points to be noted

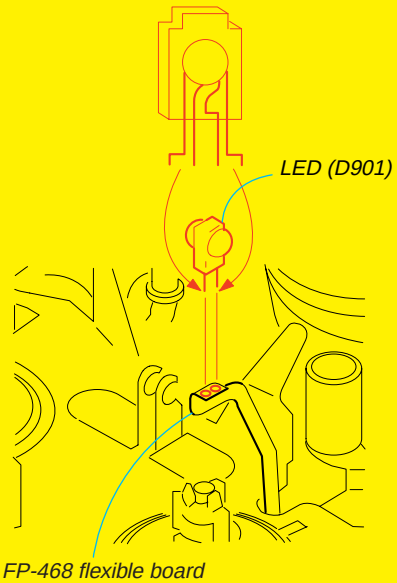
- *There must be no solder crack.*
- *There must be no scars and no stains.*
- *The flexible board must have no breakdown.*
- *The retainer plate and LED block must have no deformation.*

Soldering

Points to be noted

Rubber finger tip protection cover must be used.
Lead-free solder
Wire type: diameter ∅0.6
Soldering iron: 941 made by Hakko
Soldering iron tip: T1-1BC
Temperature of the soldering iron tip: 300 ±10 °C
Contacting time of soldering iron tip: within 2 sec.

Direction of the terminal is specified.



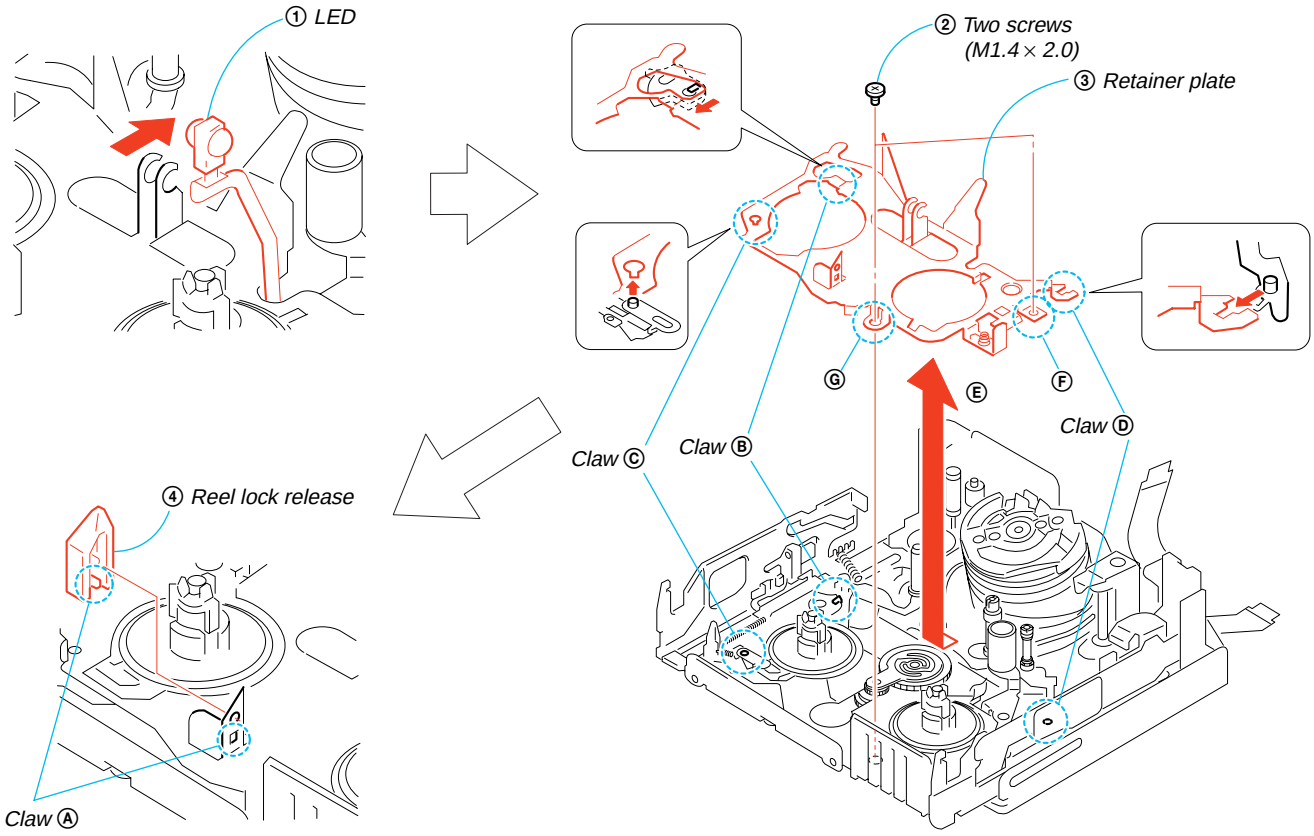
3-8. Retainer Plate

1. Removal procedure

1) Remove LED ① from the retainer plate.
2) Remove the two screws (special head screw M1.4 × 2.0) ②.
3) Release the three claws Ⓑ, Ⓒ and Ⓓ, and remove the retainer plate ③ in the direction of the arrow mark Ⓔ.
4) Release the claw Ⓐ and remove the reel lock release ④.

2. Attachment procedure

1) Install the reel lock release ④.
2) Place the retainer plate ③ on top of the LS chassis block assy and engage the three claws in the order starting from Ⓓ, Ⓒ and Ⓑ.
3) Install the two screws (special head screw M1.4 × 2.0) ② in the order starting from Ⓕ then Ⓖ.
   Tightening torque: 0.059 ± 0.01N•m (0.6 ± 0.1kgf•cm)
4) Install LED ① to the retainer plate.



REEL LOCK RELEASE

Key Points in Re-assembling

- *The reel lock release should not be re-used.*
- *The retainer plate must not have any deformation.*
- *The reel lock release should be fully installed. (Should not be left in the half-installed state.)*

RETAINER PLATE

Key Points in Re-assembling

- *All claws must be fully engaged. (Caution : No claws should be left disengaged.)*
- *The flexible board should not be pinched by anything.*
- *The retainer plate must not touch with the MIC terminal.*

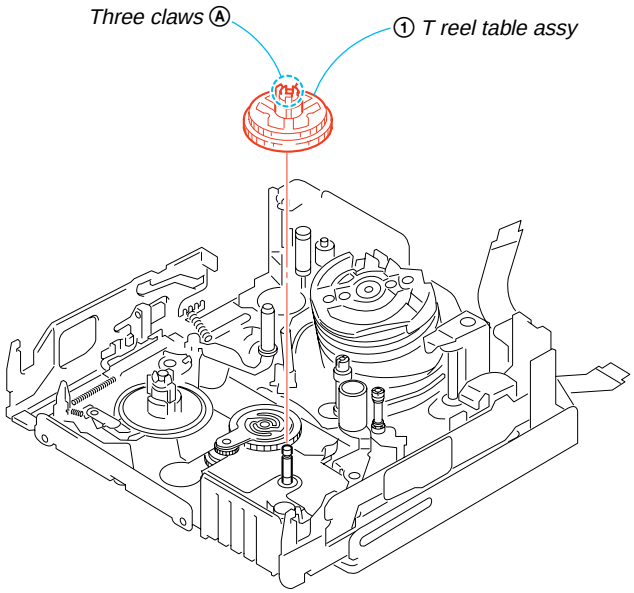
3-9. T Reel Table Assy

1. Removal procedure

1) Remove the T reel table assy ①, averting three claws Ⓐ.

2. Attachment procedure

1) Confirm that the supplied part is really the T reel table assy ①. Insert the T reel table assy ① into the T reel shaft. Install the T reel table assy ① and lock it at the position where you can hear the snapping sound. You can find the locking position by rotating the T reel table assy ①.



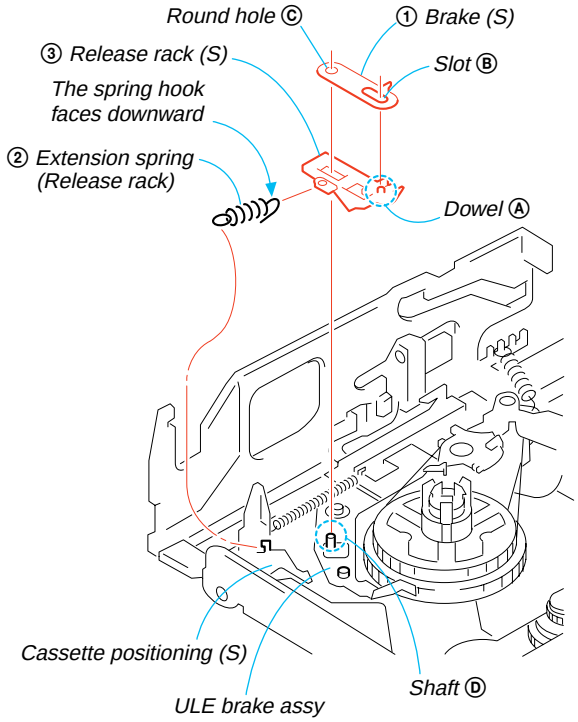
3-10. Brake (S) and Release Rack (S)

1. Removal procedure

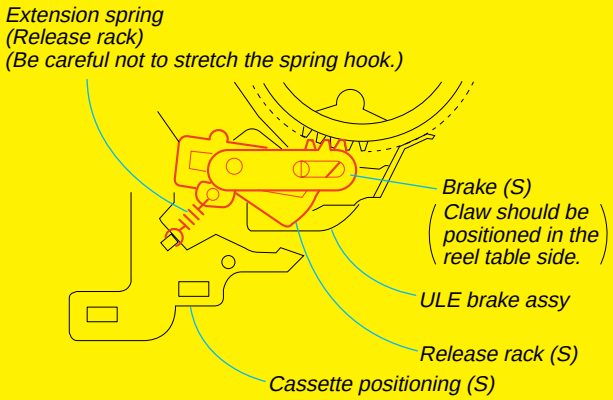
1) Remove the brake (S) ①.
2) Remove the tension spring (release rack (S)) ②.
3) Remove the release rack (S) ③.

2. Attachment procedure

1) Remove the release rack (S) ③ by holding it with a ultra precision tweezers. Install the tension spring (release rack) ② while being careful of the installation direction of the tension spring.
2) Hook the tension spring (release rack) ② on the hook of the cassette positioning (S), and then install it in the ULE brake assy.
3) Insert the slot Ⓑ in the dowel Ⓐ of the release rack (S) ③. Insert the round hole Ⓒ into the pivot shaft Ⓓ and install the brake (S) ①.
(Installation direction: Claw should be positioned in the reel table side.)



Key Points in Re-assembling


Extension spring (Release rack) (Be careful not to stretch the spring hook.)
Brake (S) Claw should be positioned in the reel table side.
ULE brake assy
Release rack (S)
Cassette positioning (S)

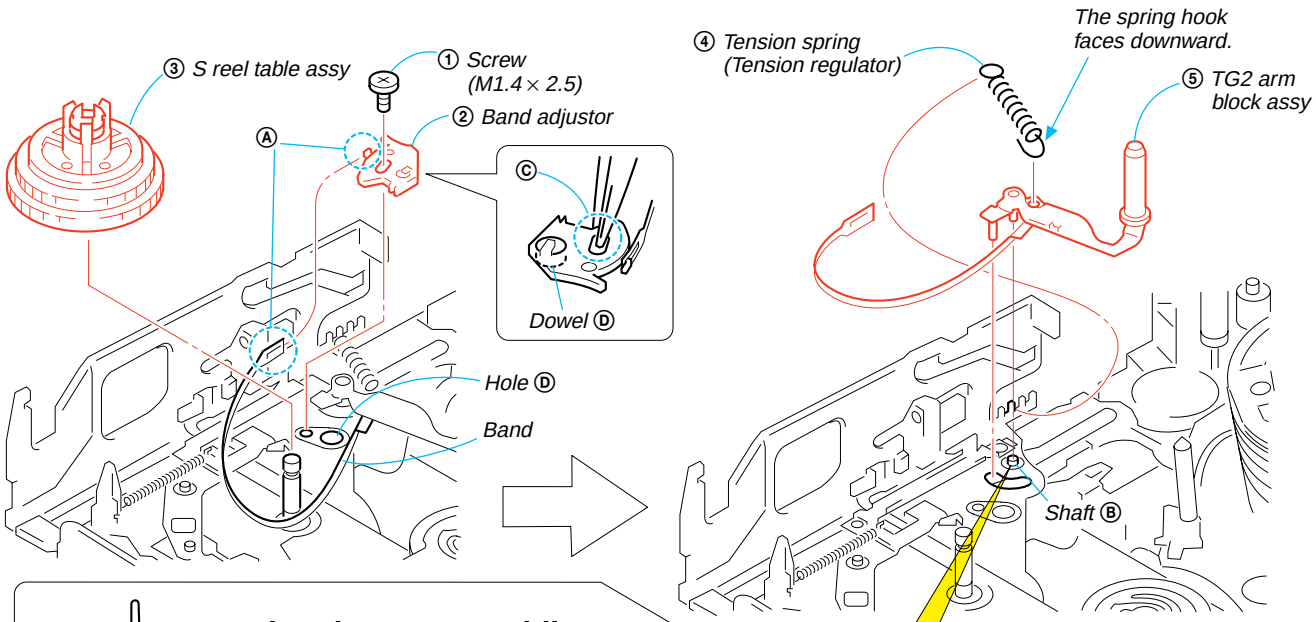
3-11. Band Adjuster, S Reel Table Assy and TG2 Arm Block Assy

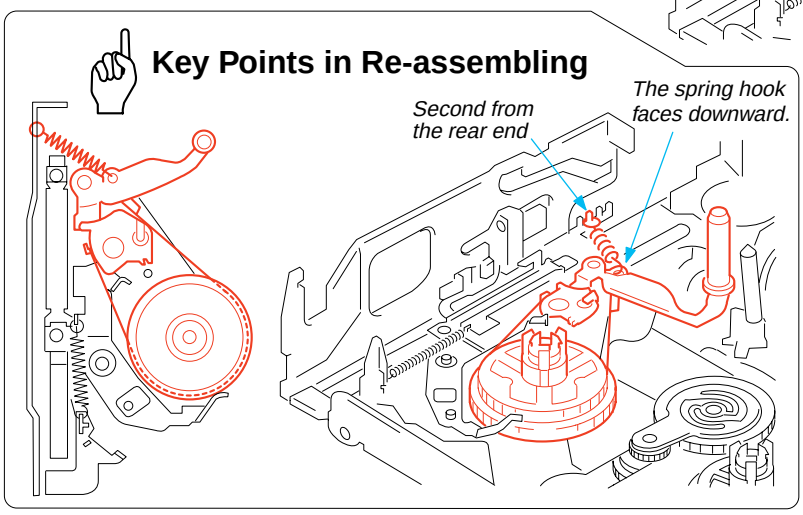
1. Removal procedure

1) Remove the screw (special head screw M1.4 × 2.5) ①.
2) Remove the band Ⓐ of the TG2 arm block and remove the band adjuster ②.
3) Remove the S reel table assy ③.
4) Remove the tension spring (tension regulator spring) ④.
5) Remove the TG2 arm block assy ⑤.

2. Attachment procedure

1) Install the S reel table assy ③.
2) Apply grease in the TG2 arm pivot shaft Ⓑ.
   Amount of grease: a ball of 1.0 mm diameter of grease
   Re-application of grease to the point which is greased already before is not necessary.
3) Hold the TG2 arm block assy ⑤ with tweezers and insert it in the TG2 arm pivot shaft Ⓑ.
4) Hook the tension spring (tension regulator spring) ④ on the TG2 arm block ⑤ with tweezers so that the hook faces downward.
5) Hook the tension spring (tension regulator spring) ④ on the LS chassis block assy (the second hook from the rear end).
6) Hook the Ⓐ portion of the band on the claw of the band adjuster ②.
7) Hold the band adjuster with tweezers as shown in Ⓒ. Insert the band into groove of the S reel table assy while rotating it, and insert the adjuster's dowel into the dowel hole Ⓓ of the LS chassis block assy.
8) Install the band adjuster ② with the screw (special head screw M1.4 × 2.5) ①.
   Tightening torque: 0.059 ± 0.01N•m (0.6 ± 0.1kgf•cm)
9) Perform the TG2 FWD Position Adjustment referring to section 4-1.
10) Perform the FWD Back-tension Adjustment referring to section 4-4.
11) Perform the Reel Torque Check referring to section 4-2.

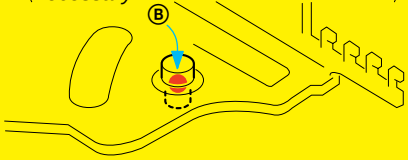




Apply Grease

Points to be noted

During installation, apply grease in the TG2 arm pivot shaft hole.
Amount of grease:
a ball of grease of 1.0 mm diameter
Re-application of grease to the point which is greased already before is not necessary.



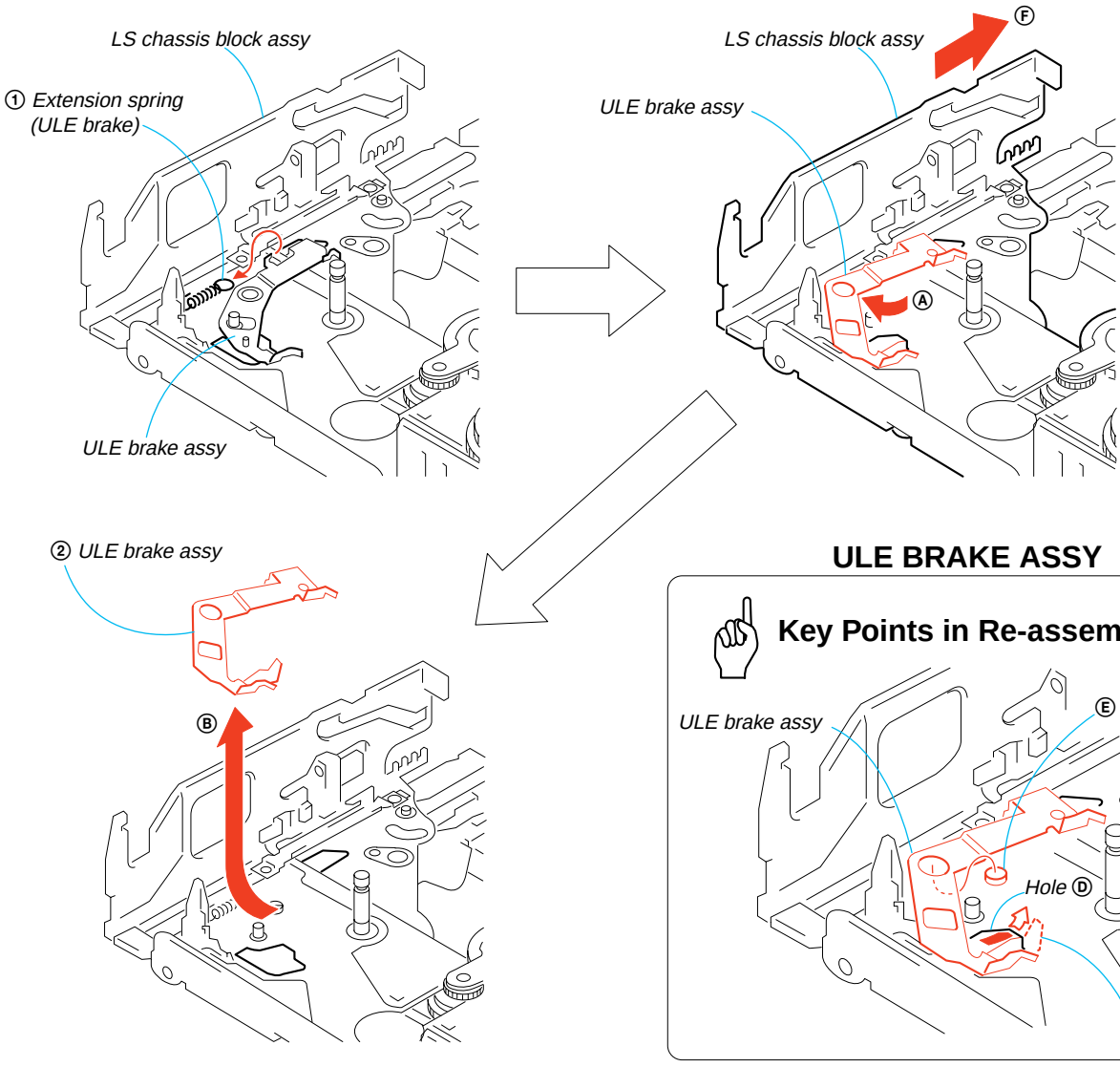
3-12. ULE Brake Assy

1. Removal procedure

1) Remove the tension spring (ULE brake) ① from the ULE brake assy ②.
2) Slide the LS chassis block assy slightly in the direction of the arrow Ⓕ.
3) Slant the ULE brake assy ② in the direction of the arrow Ⓐ and remove it by sliding it in the direction of Ⓑ.

2. Attachment procedure

1) Confirm the front side and the rear side of the ULE brake assy ②. Hold it correctly with tweezers. Insert the portion Ⓒ into the hole Ⓓ of the LS chassis block assy and install the center hole in the Ⓔ of the chassis.
2) Install the tension spring (ULE brake assy) ①.



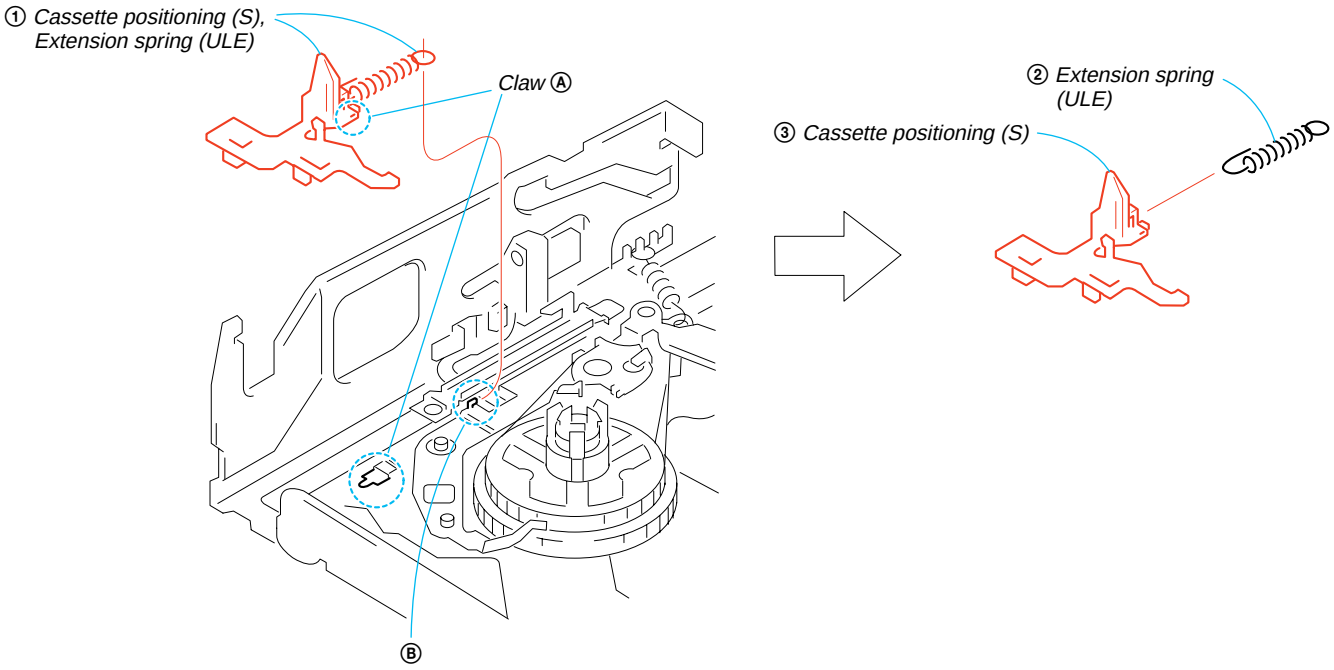
3-13. Cassette Positioning (S)

1. Removal procedure

1) Remove the tention spring (ULE brake) ② from the hook Ⓑ of ULE brake assy.
2) Slide the cassette positioning (S), then remove the cassette positioning (S) and tension spring (ULE brake) ① all together at the same time.
3) Remove the tension spring (ULE brake) ② from the cassette positioning (S) ③.

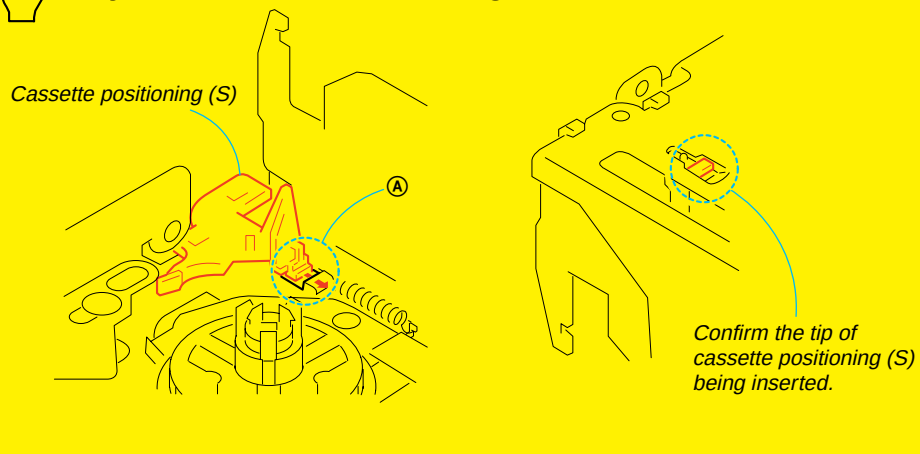
2. Attachment procedure

1) Hook the tension spring (ULE brake) ② on the cassette positioning (S) ③ with tweezers.
2) Hold the cassette positioning (S) ③ with tweezers and insert the top tip of the claw into the LS chassis block assy Ⓐ. Lock it by sliding it in.
3) Install the other end of the tension spring (ULE brake) ② on the hook Ⓑ.



CASSETTE POSITIONING (S)

Key Points in Re-assembling



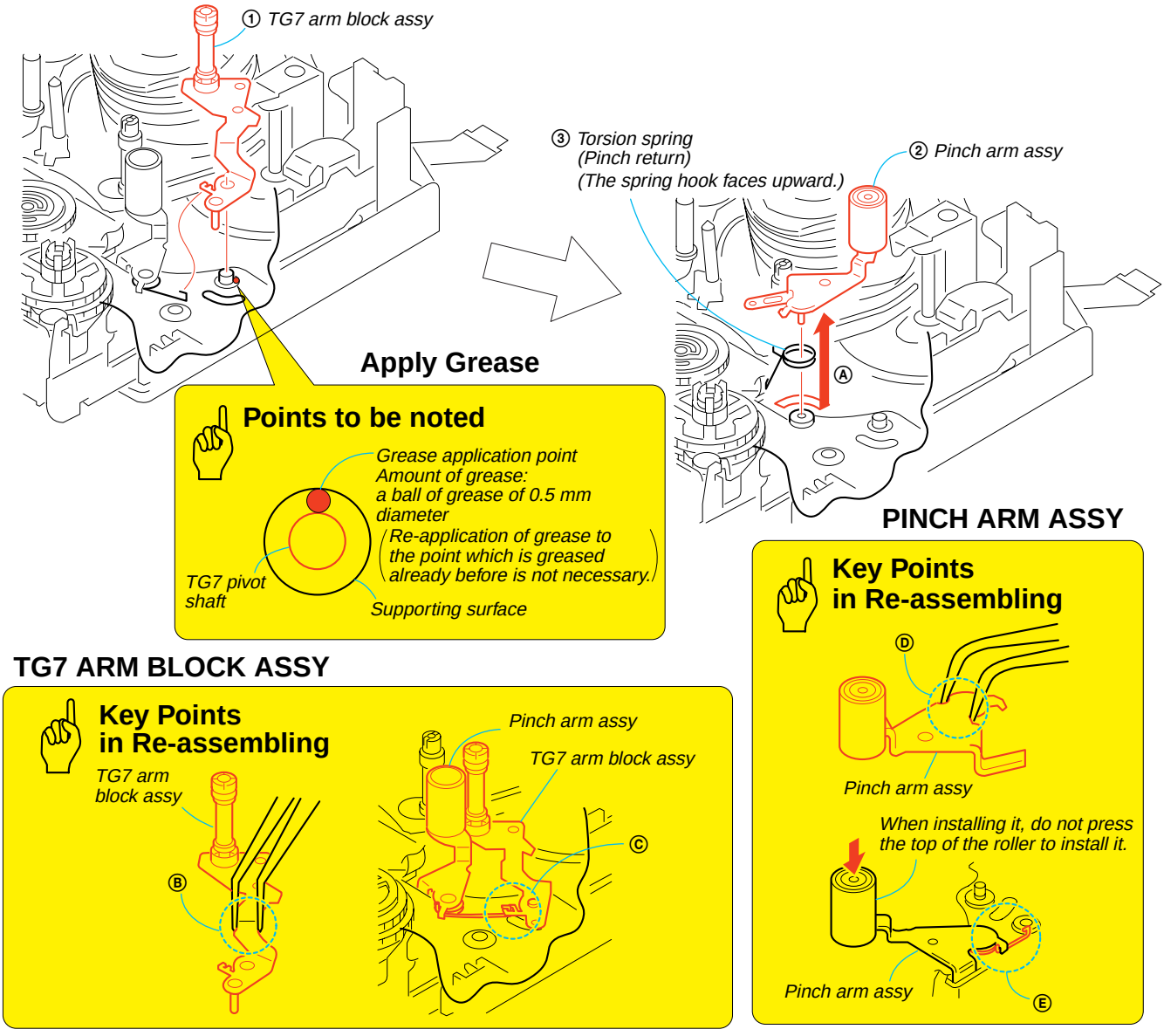
3-14. TG7 Arm Block Assy and Pinch Arm Assy

1. Removal procedure

1) Remove the TG7 arm block assy ①.
2) Rotate the pinch arm assy ② in the direction of the arrow Ⓐ and remove it.
3) Remove the torsion spring (pinch return) ③.

2. Attachment procedure

1) Hold the torsion spring (pinch return) ③ with tweezers. Confirm that the hook faces upward and install it in the bearing.
2) Hold the pinch arm assy ② as shown in Ⓓ and install it in the pinch arm bearing.
3) Hold the torsion coil spring (pinch return) ③ with tweezers and install it as shown in Ⓔ.
4) Apply grease on the supporting surface of the TG7 pivot shaft.
   Amount of grease: a ball of grease of 0.5 mm diamte
   Re-application of grease to the point which is greased already before is not necessary.
5) Hold the TG7 arm block assy ① as shown in Ⓑ and insert it in the pivot shaft of the TG7 arm.
6) Hold the torsion spring (pinch return) ③ with tweezers and install it on the hook of the TG7 arm block assy ① as shown in Ⓒ.
7) Confirm that the torsion spring (pinch return) ③ does not override on the pinch supporting shaft.



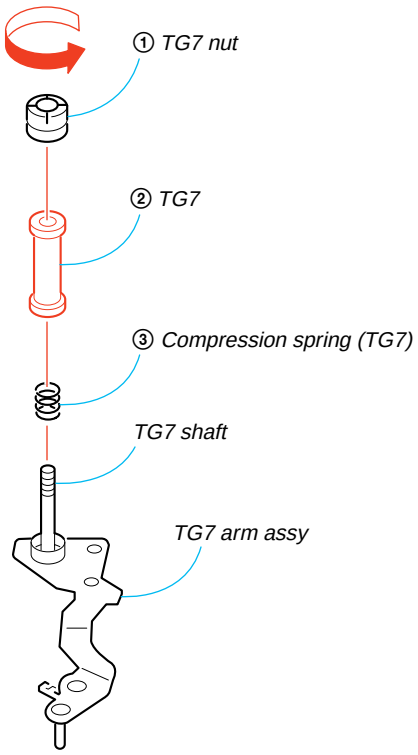
3-15. TG7

1. Removal procedure

1) Remove the TG7 nut ① by turning it in the direction of the arrow.
2) Remove the TG7 ② and compression coil spring ③ from the TG7 arm block assy.

2. Attachment procedure

1) Install the compression coil spring ③ and TG7 ② in the TG7 shaft of the TG7 arm block assy.
2) Install the TG7 nut ① by turning it in the opposite direction of the arrow.



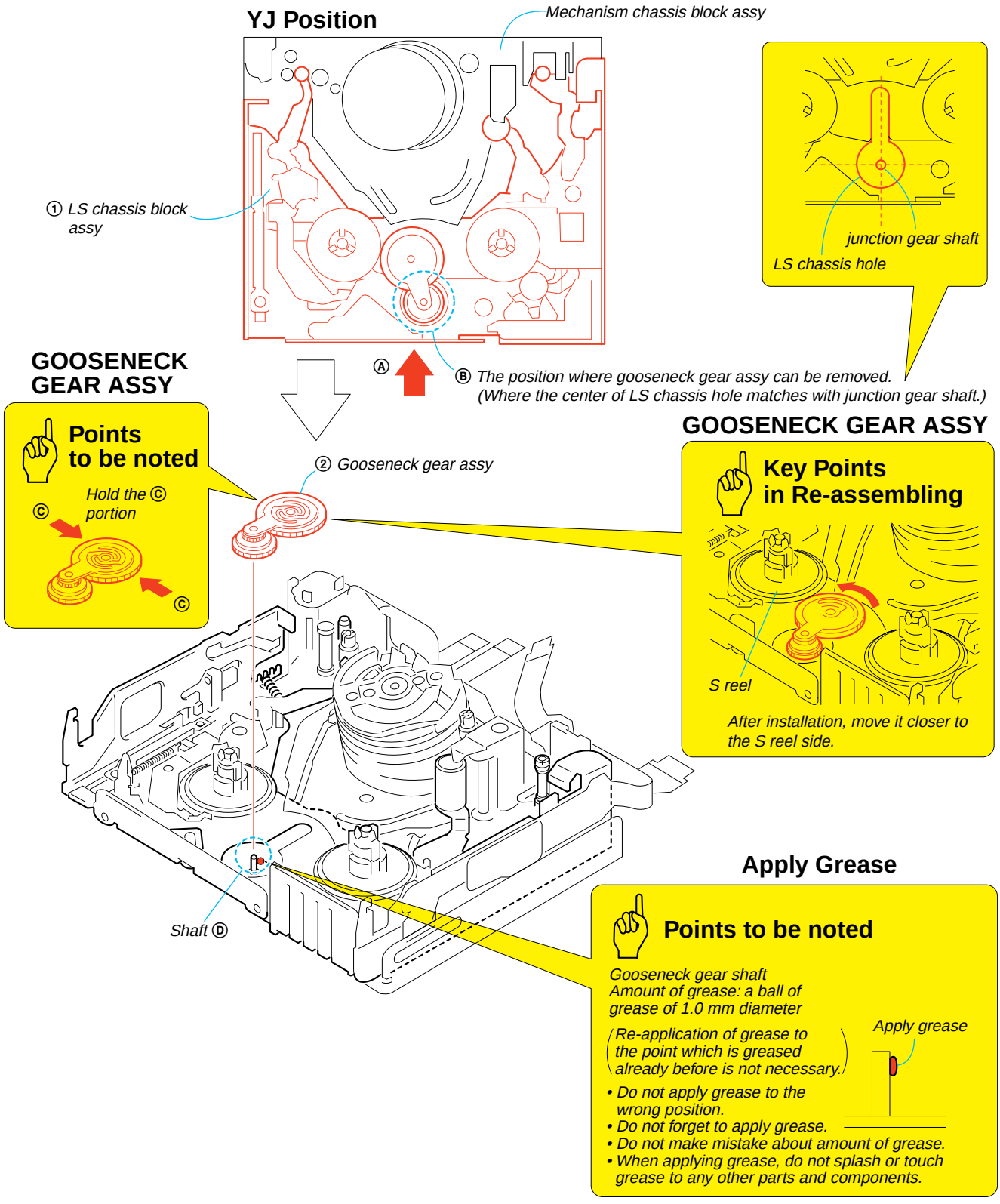
3-16. Gooseneck Gear Assy

1. Removal procedure

1) Move the LS chassis block assy ① in the direction of the arrow Ⓐ to make it in YJ position.
   YJ position: The position Ⓑ where gooseneck gear assy can be removed. (where the center of LS chassis hole matches with junction gear shaft.)
2) Remove the gooseneck gear assy, holding it with Ⓒ.

2. Attachment procedure

1) Apply grease to the gooseneck gear shaft Ⓓ portion.
   Amount of grease: a ball of grease of 1.0 mm diameter
   Need no re-application to one which applied already.
2) Install the gooseneck gear assy, holding it with Ⓒ in the gooseneck gear shaft.
3) Move it closer to the S reel.


YJ Position
Mechanism chassis block assy
① LS chassis block assy
junction gear shaft
LS chassis hole
Ⓐ
Ⓑ The position where gooseneck gear assy can be removed.
(Where the center of LS chassis hole matches with junction gear shaft.)
GOOSENECK GEAR ASSY
Points to be noted
Hold the Ⓒ portion
Ⓒ
Ⓒ
② Gooseneck gear assy
GOOSENECK GEAR ASSY
Key Points in Re-assembling
S reel
After installation, move it closer to the S reel side.
Shaft Ⓓ
Apply Grease
Points to be noted
Gooseneck gear shaft
Amount of grease: a ball of grease of 1.0 mm diameter
Re-application of grease to the point which is greased already before is not necessary.
Apply grease
• Do not apply grease to the wrong position.
• Do not forget to apply grease.
• Do not make mistake about amount of grease.
• When applying grease, do not splash or touch grease to any other parts and components.

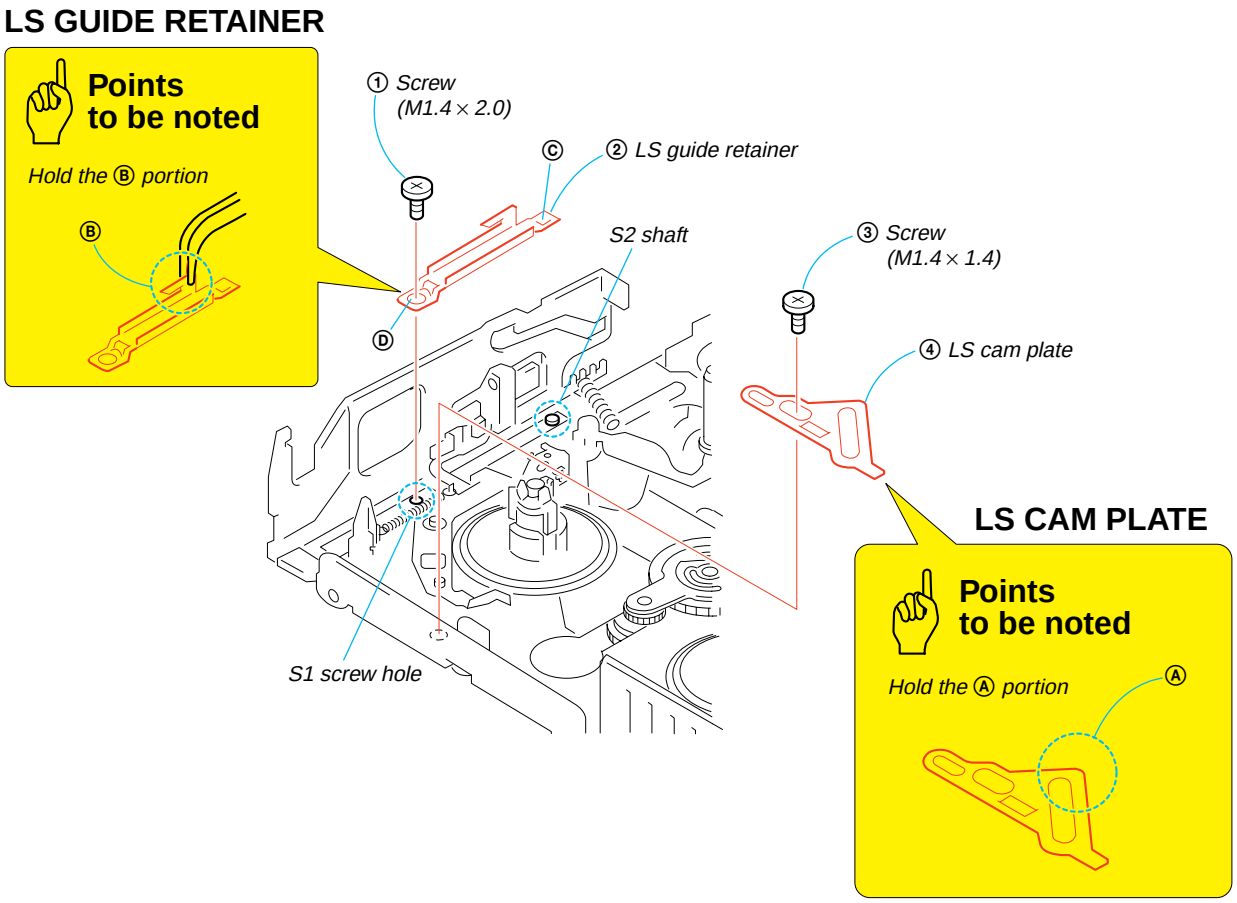
3-17. LS Guide Retainer and LS Cam Plate

1. Removal procedure

1) Remove the screw (special head screw M1.4 × 2.0) ①. and remove the LS guide retainer ②.
2) Remove the screw (special head screw M1.4 × 1.4) ③ and remove the LS cam plate ④.

2. Attachment procedure

1) Hold the LS cam plate with Ⓐ and place it aligning the two dowels. Tighten the screw (special head screw M1.4 × 1.4) ③ in half way.
2) Adjust the LS cam plate by referring to section 4-5.
3) Hold the LS guide retainer ② with Ⓑ and hook its key hole Ⓒ on the S2 shaft, and align the hole Ⓓ to S1 screw hole.
4) Install the screw (special head screw M1.4 × 2.0) ① in the S1 screw hole.
   Tightening torque: 0.059 ± 0.01N•m (0.6 ± 0.1kgf•cm)



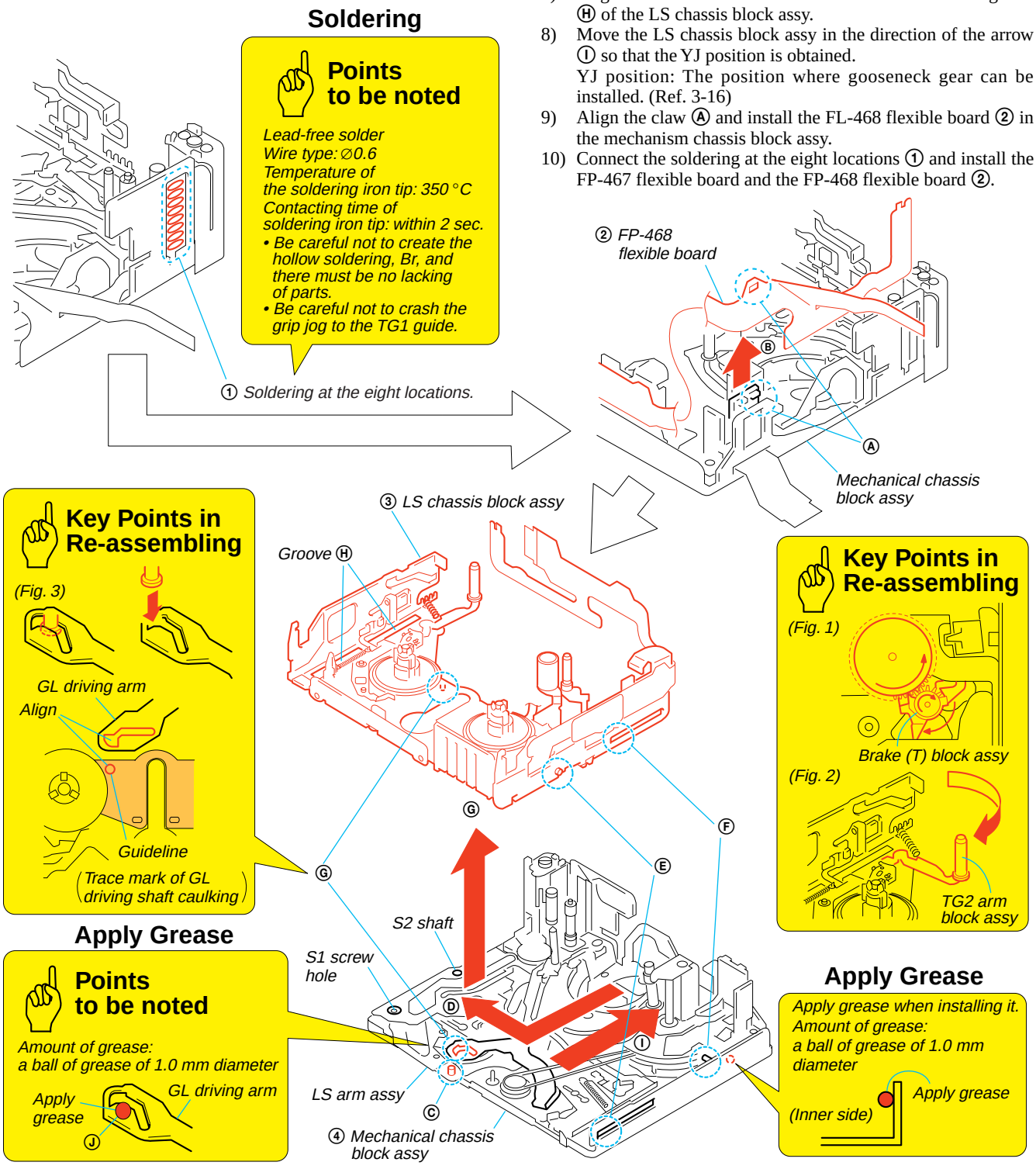
3-18. LS Chassis Block Assy and Mechanical Chassis Block Assy

1. Removal procedure

1) Remove soldering at the eight locations ①.
2) Release the claw Ⓐ and remove the FP-468 flexible board ② from the mechanical chassis block assy in the direction of the arrow Ⓑ.
3) Raise the front portion of the LS chassis block assy ③ so that the pin Ⓒ of the LS arm assy is removed. Move the LS chassis block assy ③ in the direction of the arrow Ⓓ and release the three pins of Ⓔ, Ⓕ and Ⓖ, and also groove.
4) Remove the LS chassis block ④ from the mechanical chassis block assy.

2. Attachment procedure

1) Apply grease to the GL drive arm Ⓙ portion and mechanism chassis block L.
   Amount of grease: a ball of grease of 1.0 mm diameter
2) Rotate the T reel table assy in the counter-clockwise direction and move the brake T block to the position shown in Fig. 1. (Fig. 1)
3) Move the TG2 arm block to the inner side. (Fig. 2)
4) Hold the cam groove of the GL driving arm with tweezers through LS chassis hole Ⓚ and pick it up.
5) Insert the GL drive shaft into the cam groove of the raised GL drive arm using the trace mark of caulking on the side of the S reel of the LS chassis block assy. (Fig. 3)
6) Align the pins Ⓔ, Ⓕ and Ⓖ with the grooves.
7) Align the left side S1 screw hole and S2 shaft with the goove Ⓗ of the LS chassis block assy.
8) Move the LS chassis block assy in the direction of the arrow Ⓘ so that the YJ position is obtained.
   YJ position: The position where gooseneck gear can be installed. (Ref. 3-16)
9) Align the claw Ⓐ and install the FL-468 flexible board ② in the mechanism chassis block assy.
10) Connect the soldering at the eight locations ① and install the FP-467 flexible board and the FP-468 flexible board ②.



3-19. Brake (T) Block Assy

1. Removal procedure

1) Hold the Ⓐ portion and remove the brake (T) block assy ①.

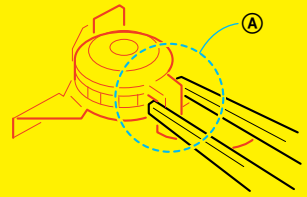
2. Attachment procedure

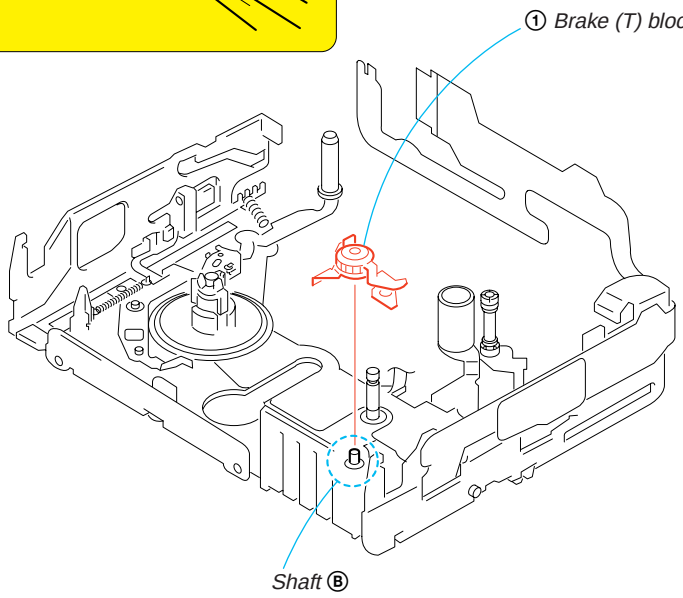
1) Hold the Ⓐ portion of the brake (T) block assy ①. While inserting the slot portion into the notch of the LS chassis block assy, install it into the shaft Ⓑ.
2) After completing installation of T reel table assy (Refer to 3-9.), rotate the brake (T) block assy ① in the clockwise direction by rotating T reel talbe assy in the counter-clockwise direction. (Fig. 1)

BRAKE (T) BLOCK ASSY

Points to be noted

Hold the Ⓐ portion

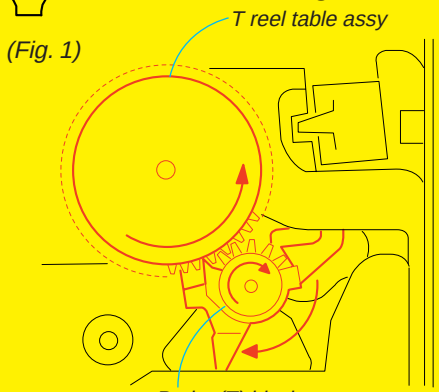




BRAKE (T) BLOCK ASSY

Key Points in Re-assembling

(Fig. 1)



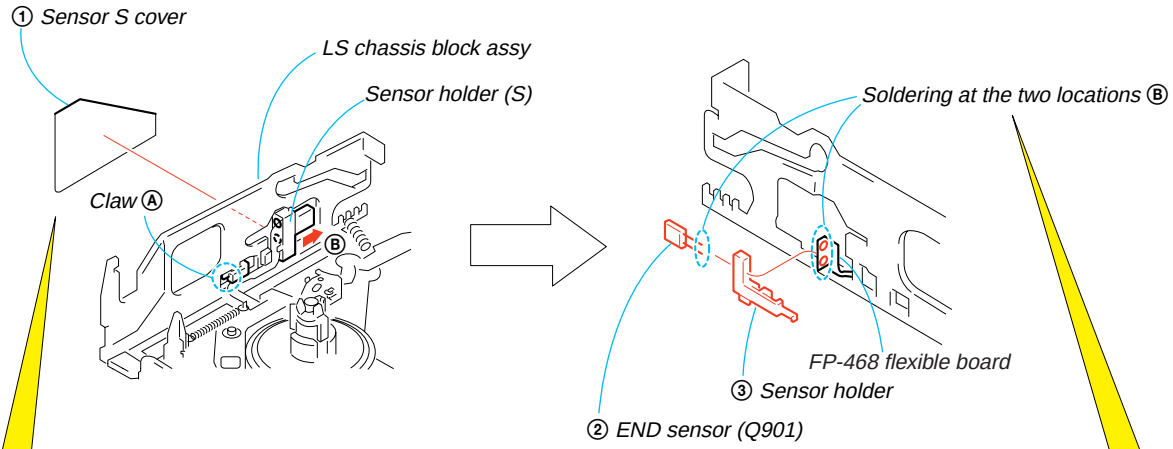
3-20. END Sensor (Q901)

1. Removal procedure

1) Peel off the sensor S cover ①.
2) Release the claw Ⓐ of the sensor holder (S) ③. Remove it from the LS chassis block assy by sliding it in the direction of the arrow Ⓑ.
3) Remove soldering at the two locations and remove the END sensor (Q901) ② and the sensor holder (S) ①.

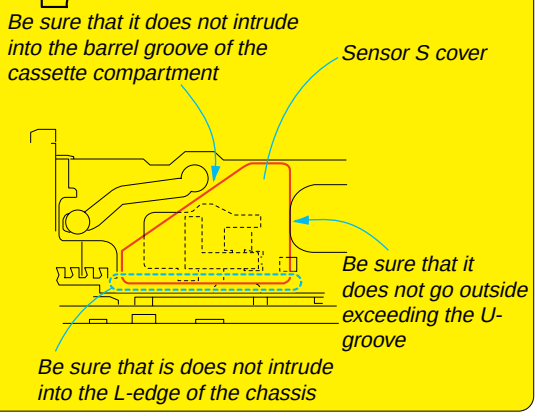
2. Attachment procedure

1) Connect the END sensor (Q901) ② and the sensor holder (S) ③ to the FP-468 flexible board by soldering them at the two locations Ⓑ.
2) Slide the END sensor (Q901) ② and the sensor holder (S) ③ in the direction of the arrow Ⓒ to install them in the LS chassis block assy.
3) Hook the flexible board on the end of the Ⓓ portion.
4) Attach the sensor S cover ①.



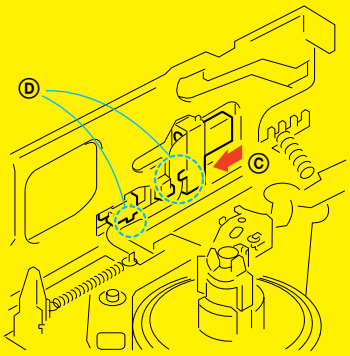
SENSOR S COVER

Key Points in Re-assembling


Be sure that it does not intrude into the barrel groove of the cassette compartment
Sensor S cover
Be sure that it does not go outside exceeding the U-groove
Be sure that is does not intrude into the L-edge of the chassis

END SENSOR (Q901), SENSOR HOLDER (S)

Key Points in Re-assembling



Soldering

Points to be noted

Use the rubber finger tip
cover Lead-free solder
Wire type : ∅0.6
Soldering iron : 941 made by Hakko
Soldering iron tip : T1-1BC

Temperature of the soldering iron tip : 300 ±10 °C
Contacting time of soldering iron tip : within 2 sec

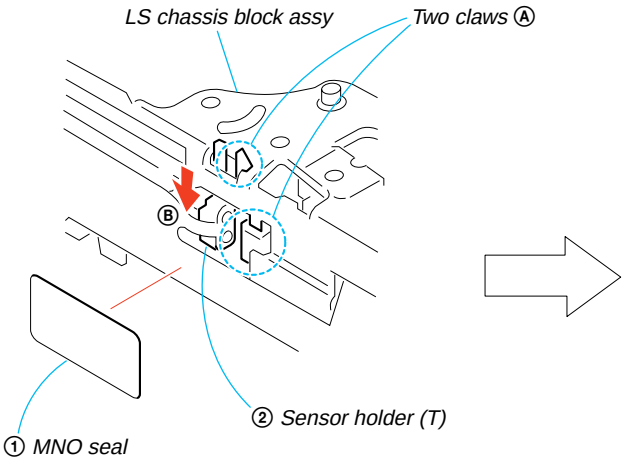
3-21. TOP Sensor (Q902)

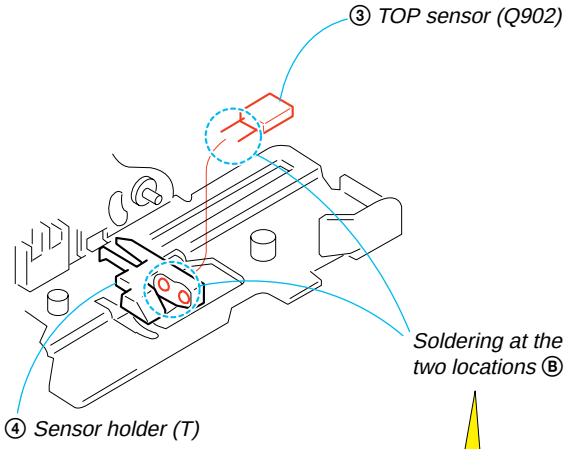
1. Removal procedure

1) Peel off the MNO seal ①.
2) Release the two claws of the sensor holder (T) ② at the two locations Ⓐ. Remove it from the LS chassis block assy by sliding it in the direction of the arrow Ⓑ.
3) Remove the soldering at the two locations Ⓑ and remove the TOP sensor (Q902) ③ and the sensor holder (T) ④.

2. Attachment procedure

1) Connect the TOP sensor (Q902) ③ and the sensor holder (T) ④ to the FP-468 flexible board by soldering them at the two locations Ⓑ.
2) Engage the two claws Ⓐ to install the TOP sensor (Q902) ③ and the sensor holder (T) ④ in the LS chassis block assy.
3) Attach the MNO seal ①.





Soldering

Points to be noted

Use the rubber finger tip cover
Lead-free solder
Wire type : ∅0.6
Soldering iron : 941 made by Hakko
Soldering iron tip : T1-1BC

Temperature of the soldering iron tip : 300 ±10 °C
Contacting time of soldering iron tip : within 2 sec

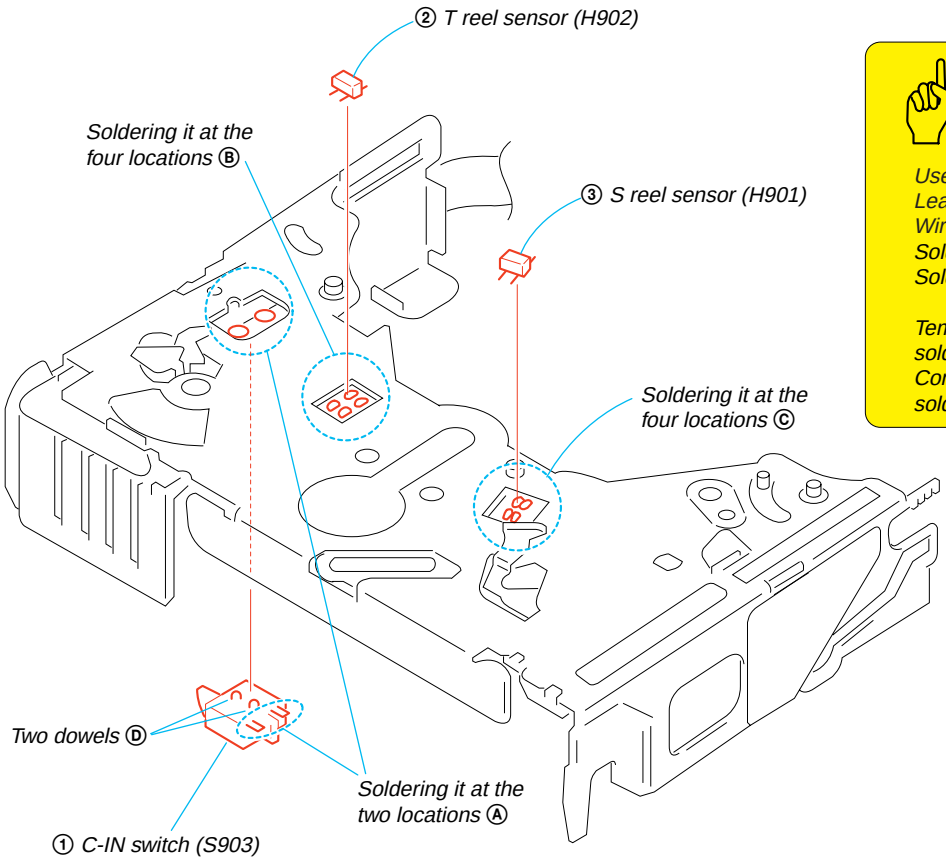
3-22. C-IN Switch (S903), S Reel Sensor (H901) and T Reel Sensor (H902)

1. Removal procedure

1) Remove soldering at the two locations Ⓐ and remove the C-IN switch (S903) ①.
2) Remove soldering at the four locations Ⓑ and remove the T reel sensor (H902) ②.
3) Remove soldering at the four locations Ⓑ and remove the S reel sensor (H901) ③.

2. Attachment procedure

1) Connect the S reel sensor (H901) ③ to the FP-468 flexible board by soldering it at the four locations Ⓒ.
2) Connect the T reel sensor (H902) ② to the FP-468 flexible board by soldering it at the four locations Ⓑ.
3) Align the two dowels Ⓓ and connect the C-IN switch (S903) ① to the FP-468 flexible board by soldering it at the two locations Ⓐ.


② T reel sensor (H902)
Soldering it at the four locations Ⓑ
③ S reel sensor (H901)
Soldering it at the four locations Ⓒ
Two dowels Ⓓ
Soldering it at the two locations Ⓐ
① C-IN switch (S903)

Soldering

Points to be noted

Use the rubber finger tip cover
Lead-free solder
Wire type : ∅0.6
Soldering iron : 941 made by Hakko
Soldering iron tip : T1-1BC

Temperature of the soldering iron tip : 300 ± 10 °C
Contacting time of soldering iron tip : within 2 sec

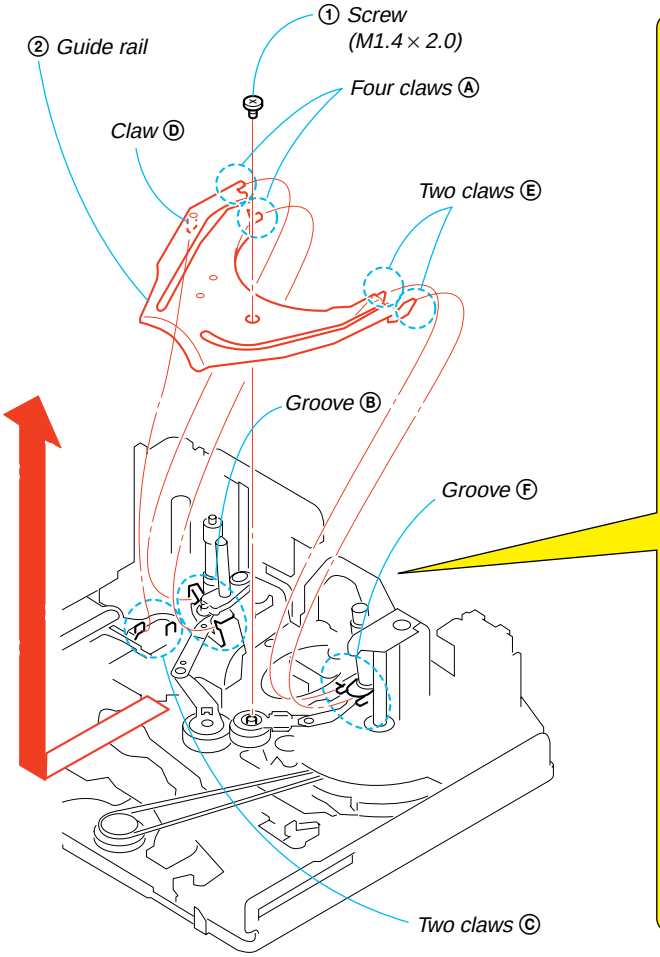
3-23. Guide Rail

1. Removal procedure

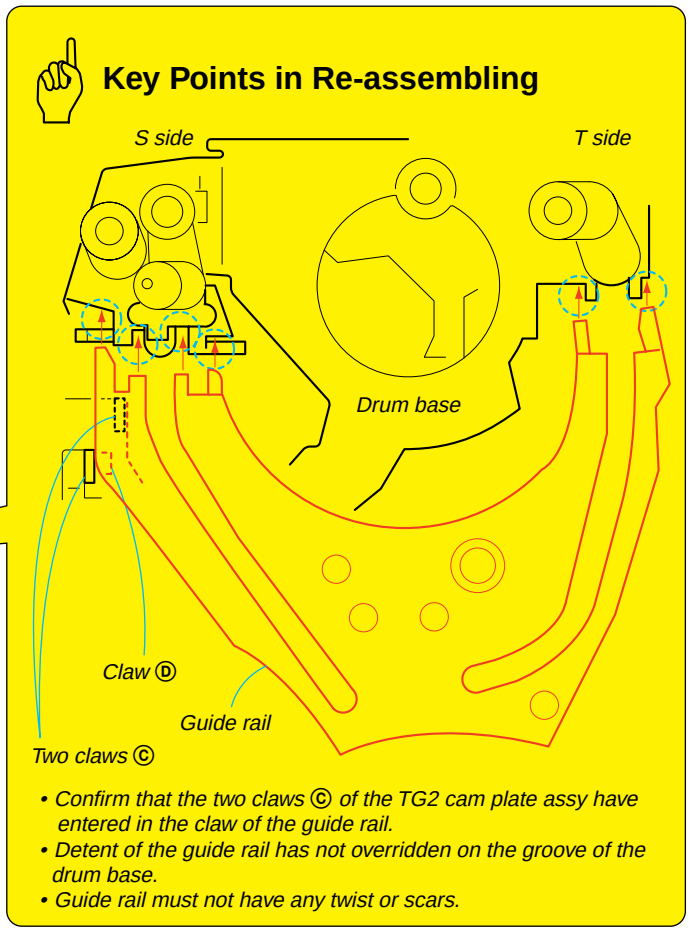
1) Remove the screw (special head screw M1.4 × 2.0) ①.
2) Remove the guide rail ② in the direction of the arrow.

2. Attachment procedure

1) Hold the center of the guide rail ②. While pressing the TG2 cam plate assy, insert the four claws Ⓐ of the guide rail in a slant angle from the top into the drum base's groove Ⓑ. (Insert the top tip of the rail at the same time.) Confirm at this time that the two claws of the TG cam plate assy have entered in the claw Ⓓ of the guide rail.
2) Insert the two claws Ⓔ of the T side guide rail into the groove Ⓕ of the drum base.
3) Tighten the screw (special head screw M1.4 × 2.0) ①.
Tightening torque: 0.059 ± 0.01N•m (0.6 ± 0.1kgf•cm)



GUIDE RAIL


Key Points in Re-assembling
S side
T side
Drum base
Claw Ⓓ
Guide rail
Two claws Ⓒ
• Confirm that the two claws Ⓒ of the TG2 cam plate assy have entered in the claw of the guide rail.
• Detent of the guide rail has not overridden on the groove of the drum base.
• Guide rail must not have any twist or scars.

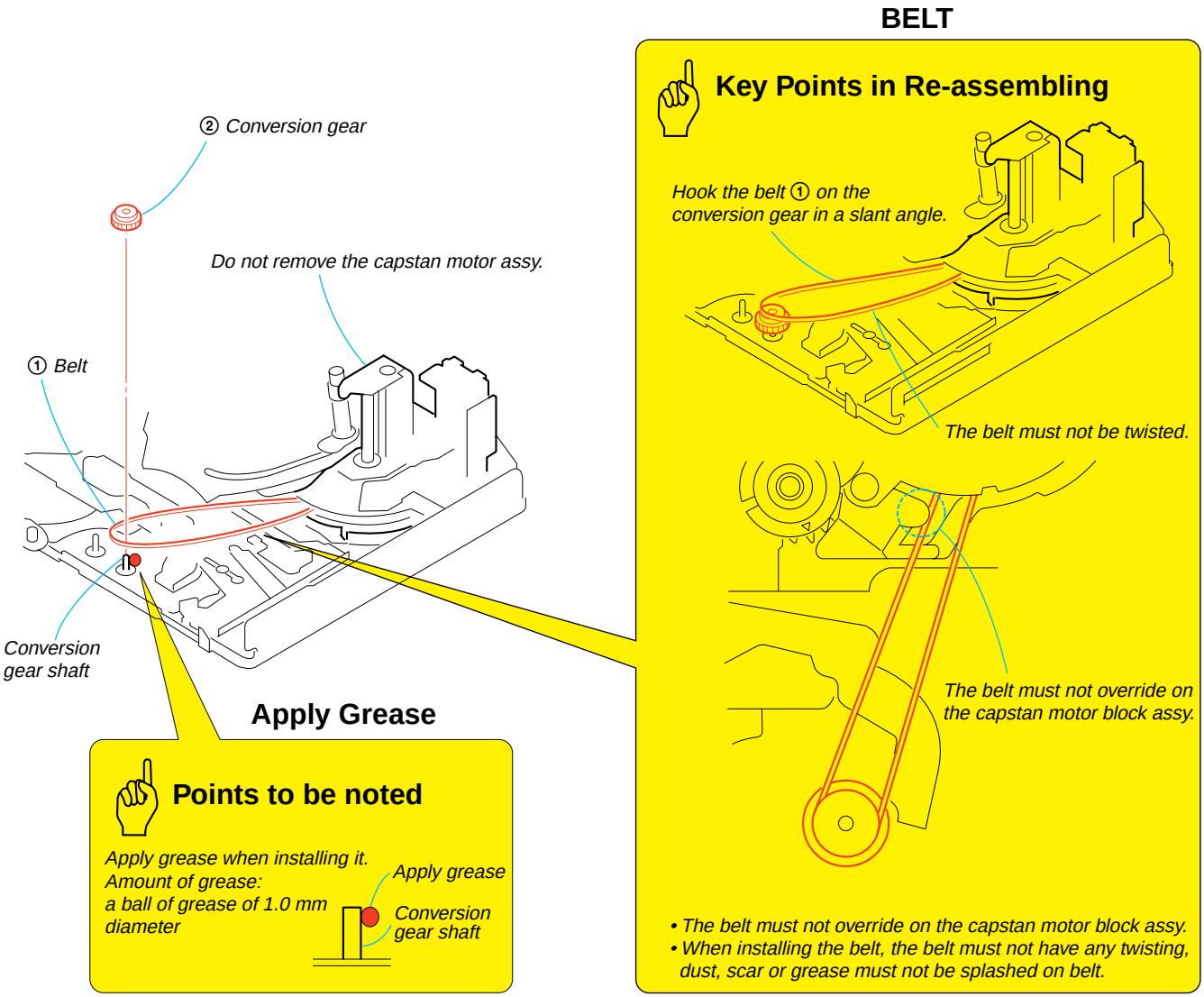
3-24. Conversion Gear

1. Removal procedure

1) Remove the belt ① from the conversion gear.
2) Remove the conversion gear ② from the conversion gear shaft.

2. Attachment procedure

1) Apply grease to the conversion gear shaft.
   Amount of grease: a ball of grease of 1.0 mm diameter
2) Install the conversion gear ② in the conversion gear shaft.
3) Hook the belt ① on the conversion gear in a slant angle and install it by rotating the conversion gear with fingertip.


② Conversion gear
Do not remove the capstan motor assy.
① Belt
Conversion gear shaft
Apply Grease
Points to be noted
Apply grease when installing it.
Amount of grease:
a ball of grease of 1.0 mm diameter
Apply grease
Conversion gear shaft
BELT
Key Points in Re-assembling
Hook the belt ① on the conversion gear in a slant angle.
The belt must not be twisted.
The belt must not override on the capstan motor block assy.
• The belt must not override on the capstan motor block assy.
• When installing the belt, the belt must not have any twisting, dust, scar or grease must not be splashed on belt.

3-25. Coaster (S) Block Assy and Coaster (T) Block Assy

1. Removal procedure

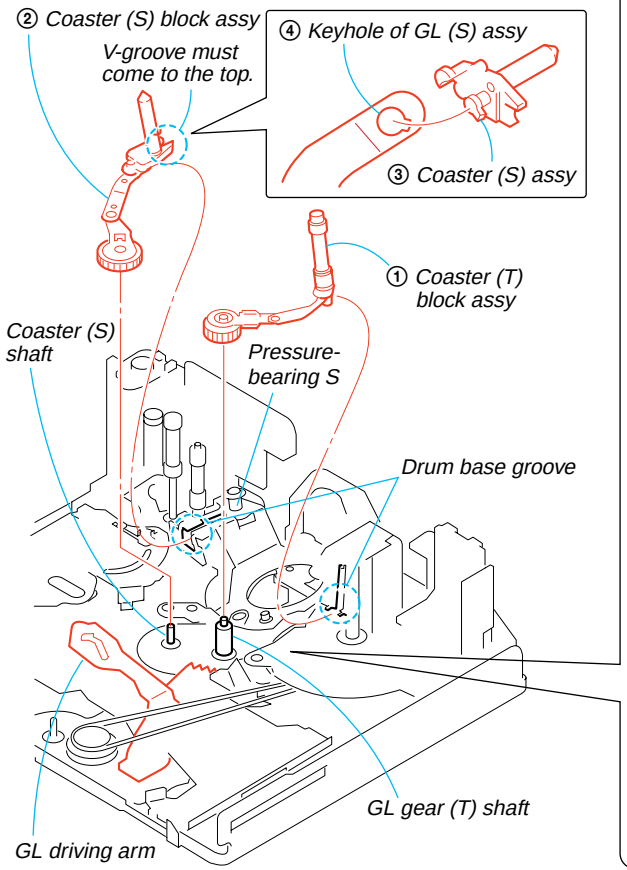
1) Remove the coaster (T) block assy ① from the coaster (T) block shaft. Remove the coaster (T) block assy from the right groove of the drum base.
2) Remove the coaster (S) block assy ② from the coaster (S) block shaft. Remove the coaster (S) block assy from the left groove of the drum base.
3) Remove coaster (S) assy ③ by rotating it through the key hole of GL (S) assy ④.

2. Attachment procedure

1) Install the coaster (S) assy ③ into the key hole of the GL (S) assy ④ by rotating it.
2) Insert the coaster (S) block assy ② into the coaster (S) block shaft. While aligning it with the left groove of the drum base, push it in the way that the V-groove comes to the top until it reaches the pressure-bearing S.
3) Push in the coaster (T) block assy ① along with the right groove of the drum base. Align the phase of the GL gear S, GL gear T and the GL drive arm at the three phasing locations. Then install the coaster (T) block assy ① in the coaster (T) block assy shaft.

Key Points in Re-assembling

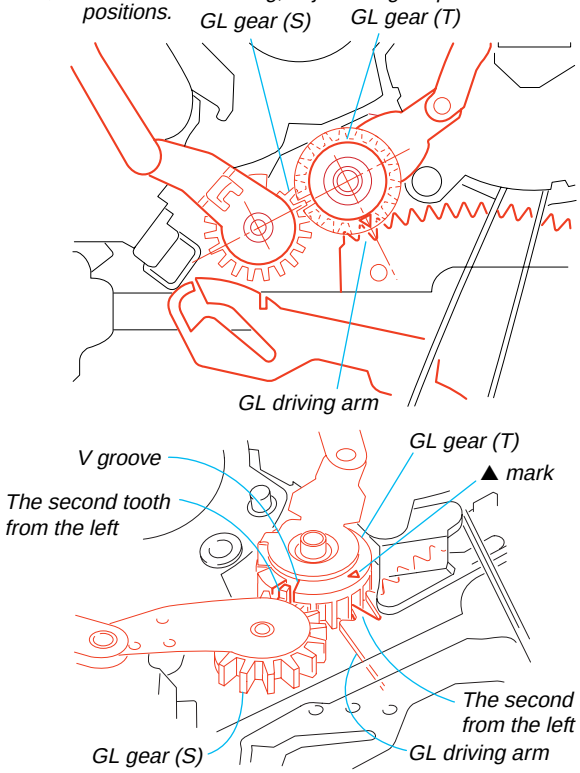
- *When aligning the coaster (S) assy with the left groove of the drum base, the V-groove must come to the top.*
- *TG4 and TG5 must not have any stain and their arms must not be deformed.*


② Coaster (S) block assy
V-groove must come to the top.
④ Keyhole of GL (S) assy
③ Coaster (S) assy
① Coaster (T) block assy
Coaster (S) shaft
Pressure-bearing S
Drum base groove
GL gear (T) shaft
GL driving arm

Phase Adjustment

Key Points in Re-assembling

When re-assembling, adjust the gear phase at the three positions.



- *The second tooth from the left of the GL gear (S) and the V-groove of the GL gear (T) must be in phase.*
- *The second tooth from the left of the GL drive arm and the ▲ mark must be in phase.*

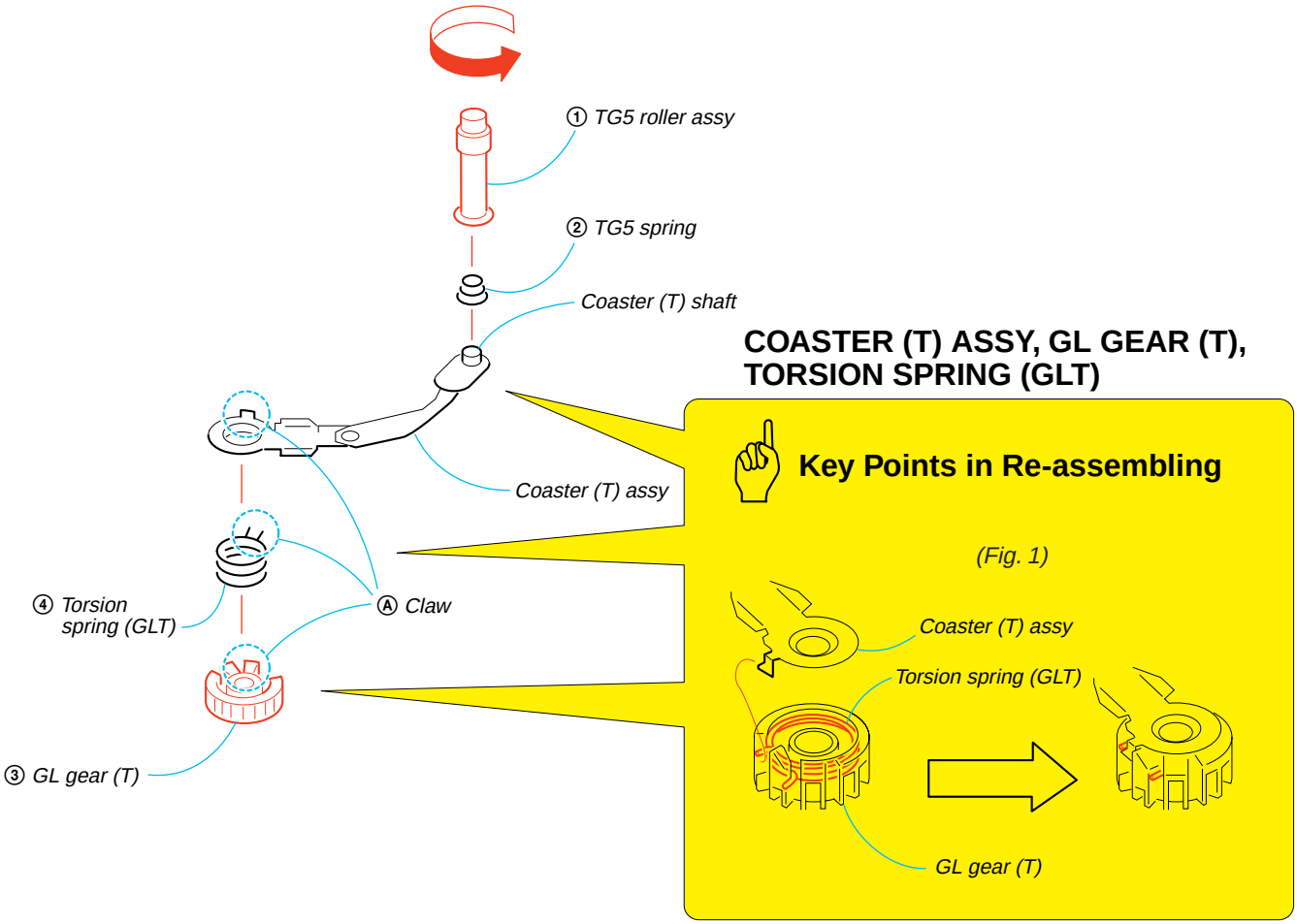
3-26. TG5 Roller Assy and GL Gear (T)

1. Removal procedure

1) Rotate the TG5 roller assy ① in the direction of the arrow and remove the TG5 roller assy ① and the TG5 spring ② from the coaster (T) assy.
2) Release the claw (A) and remove the GL gear (T) ③ and the torsion coil spring (GLT) ④ from the coaster (T) assy.

2. Attachment procedure

1) Install the GL gear (T) ③ and the torsion coil spring (GLT) ④ into the coaster (T) assy.
2) Install the TG5 spring ② into the coaster (T) assy.
3) Install the TG5 roller assy ① into the coaster (T) assy by rotating it in the direction opposite to the arrow.



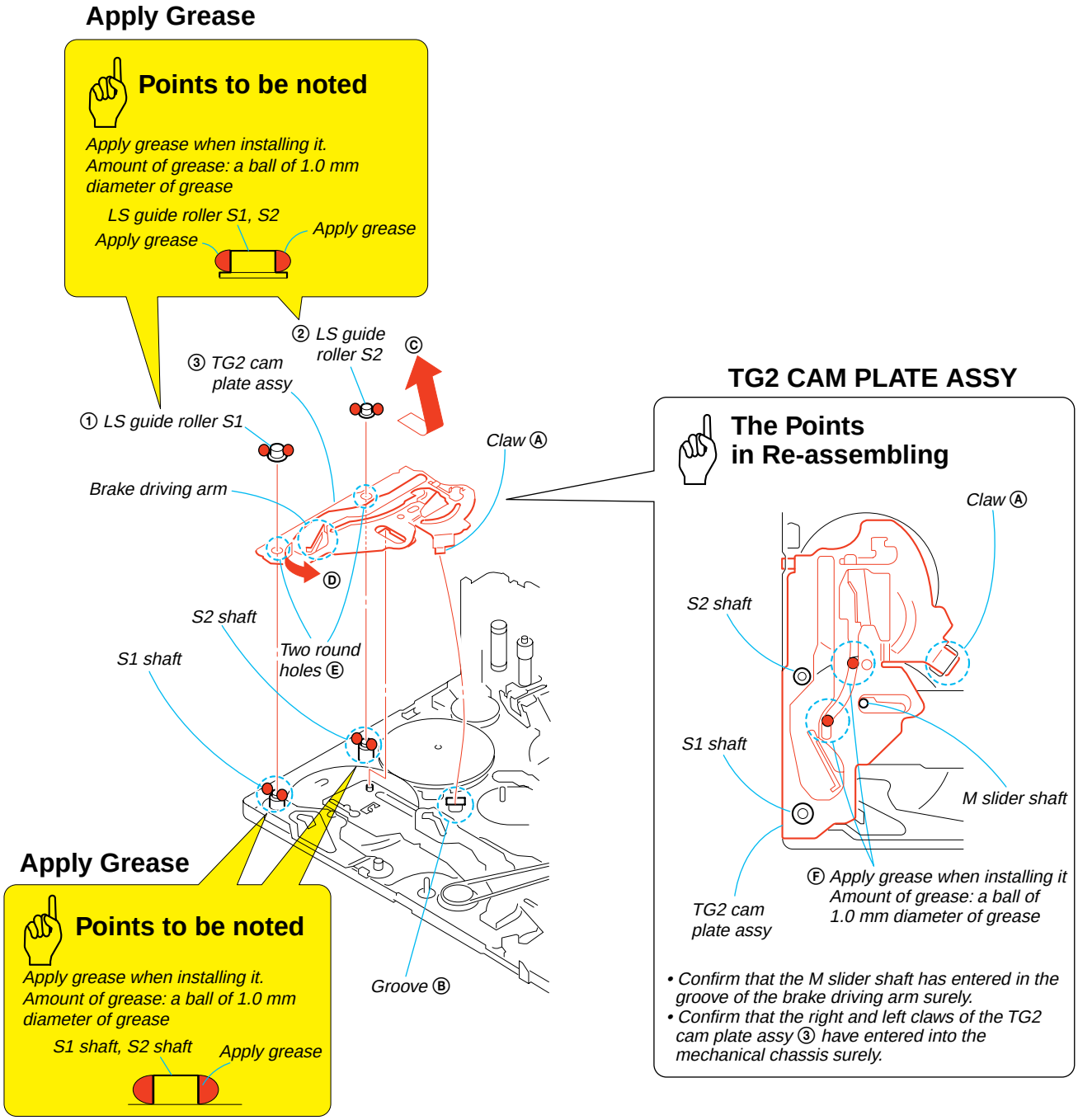
3-27. TG2 Cam Plate Assy

1. Removal procedure

1) Remove the LS guide roller (S1) ① from the S1 shaft.
2) Remove the LS guide roller (S2) ② from the S2 shaft.
3) Release the claw Ⓐ of the TG2 cam plate assy ③ from the right groove Ⓑ of the mechanical chassis.
4) Remove the TG2 cam plate assy ③ in the direction of the arrow Ⓒ.

2. Attachment procedure

1) Move the brake driving arm of the TG2 cam plate assy ③ in the direction of the arrow Ⓓ.
2) Insert the right claw Ⓐ of the TG2 cam plate assy ③ into the right groove Ⓑ of the mechanical chassis first.
3) Install the two round holes Ⓔ of the TG2 cam plate assy ③ into the S1 shaft and the S2 shaft.
4) Apply grease in the Ⓕ portion of the TG2 cam plate assy.
   Amount of grease: a ball of 1.0 mm diameter of grease
5) Apply grease to both sides of the S1 shaft and the S2 shaft.
   Amount of grease: a ball of 1.0 mm diameter of grease
6) Apply grease to both sides of the LS guide roller S1, S2.
7) Install the LS guide roller S1 ① in the S1 shaft.
8) Install the LS guide roller S2 ② in the S2 shaft.


Apply Grease
Points to be noted
Apply grease when installing it.
Amount of grease: a ball of 1.0 mm diameter of grease
LS guide roller S1, S2
Apply grease
Apply grease
② LS guide roller S2
Ⓒ
③ TG2 cam plate assy
① LS guide roller S1
Claw Ⓐ
Brake driving arm
Ⓓ
S2 shaft
S1 shaft
Two round holes Ⓔ
Groove Ⓑ
Apply Grease
Points to be noted
Apply grease when installing it.
Amount of grease: a ball of 1.0 mm diameter of grease
S1 shaft, S2 shaft
Apply grease
TG2 CAM PLATE ASSY
The Points in Re-assembling
Claw Ⓐ
S2 shaft
S1 shaft
M slider shaft
Ⓕ Apply grease when installing it
Amount of grease: a ball of 1.0 mm diameter of grease
TG2 cam plate assy
• Confirm that the M slider shaft has entered in the groove of the brake driving arm surely.
• Confirm that the right and left claws of the TG2 cam plate assy ③ have entered into the mechanical chassis surely.

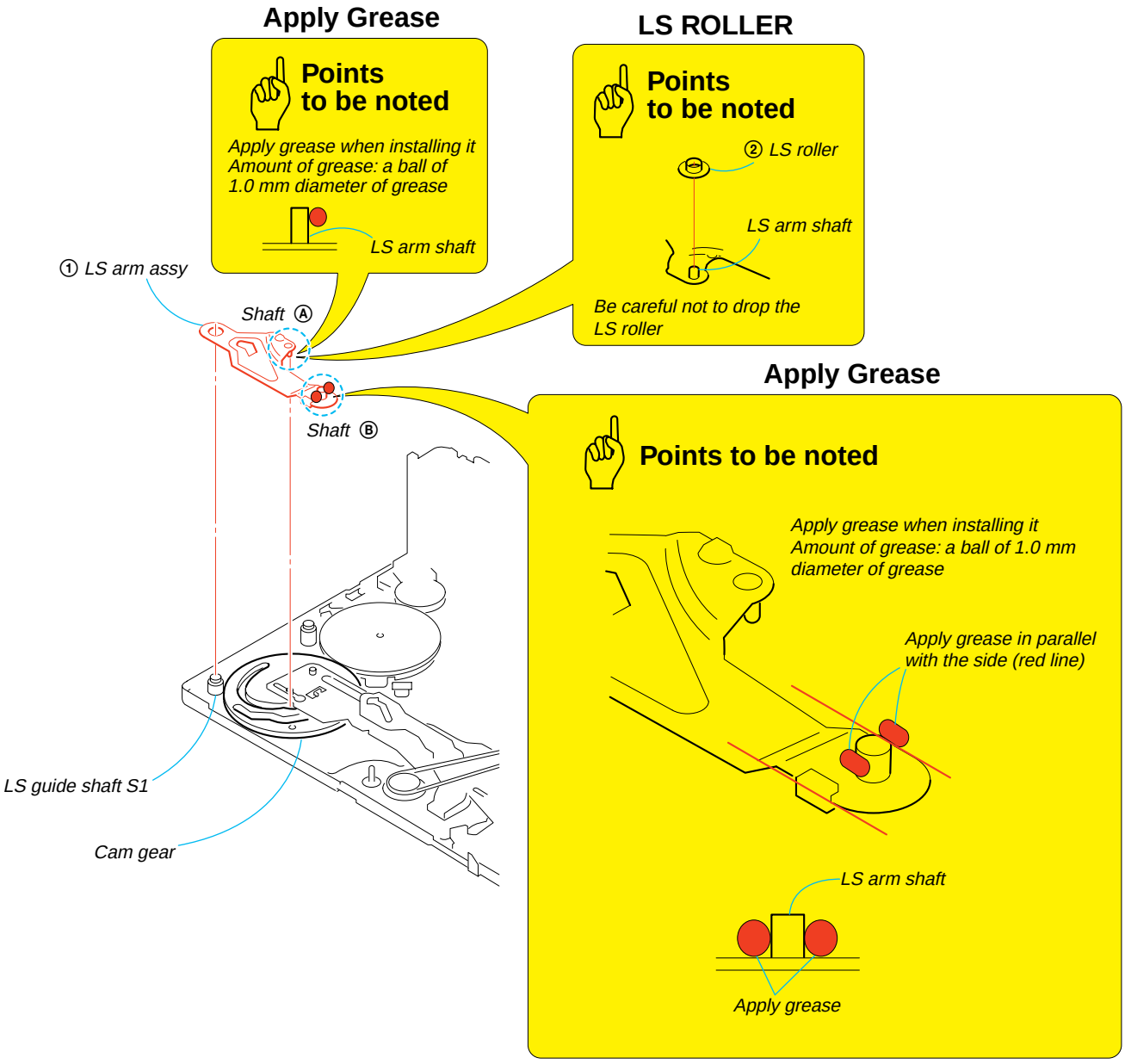
3-28. LS Arm Assy

1. Removal procedure

1) Remove the LS arm assy ① from the LS guide S1 shaft.
2) Turn over the LS arm assy and remove the LS roller ②.

2. Attachment procedure

1) Apply grease to the LS arm shaft Ⓐ (on the side).
2) Install the LS roller ② into the LS arm shaft.
3) Turn over the LS arm assy ① and install it while matching the phase of the LS guide shaft S1 and the cam gear groove.
4) Apply grease to the LS arm shaft Ⓑ (on its side).


Apply Grease
Points to be noted
Apply grease when installing it
Amount of grease: a ball of 1.0 mm diameter of grease
LS arm shaft
LS ROLLER
Points to be noted
② LS roller
LS arm shaft
Be careful not to drop the LS roller
① LS arm assy
Shaft Ⓐ
Shaft Ⓑ
Apply Grease
Points to be noted
Apply grease when installing it
Amount of grease: a ball of 1.0 mm diameter of grease
Apply grease in parallel with the side (red line)
LS arm shaft
Apply grease
LS guide shaft S1
Cam gear

3-29. M Slider Assy (1)

1. Removal procedure

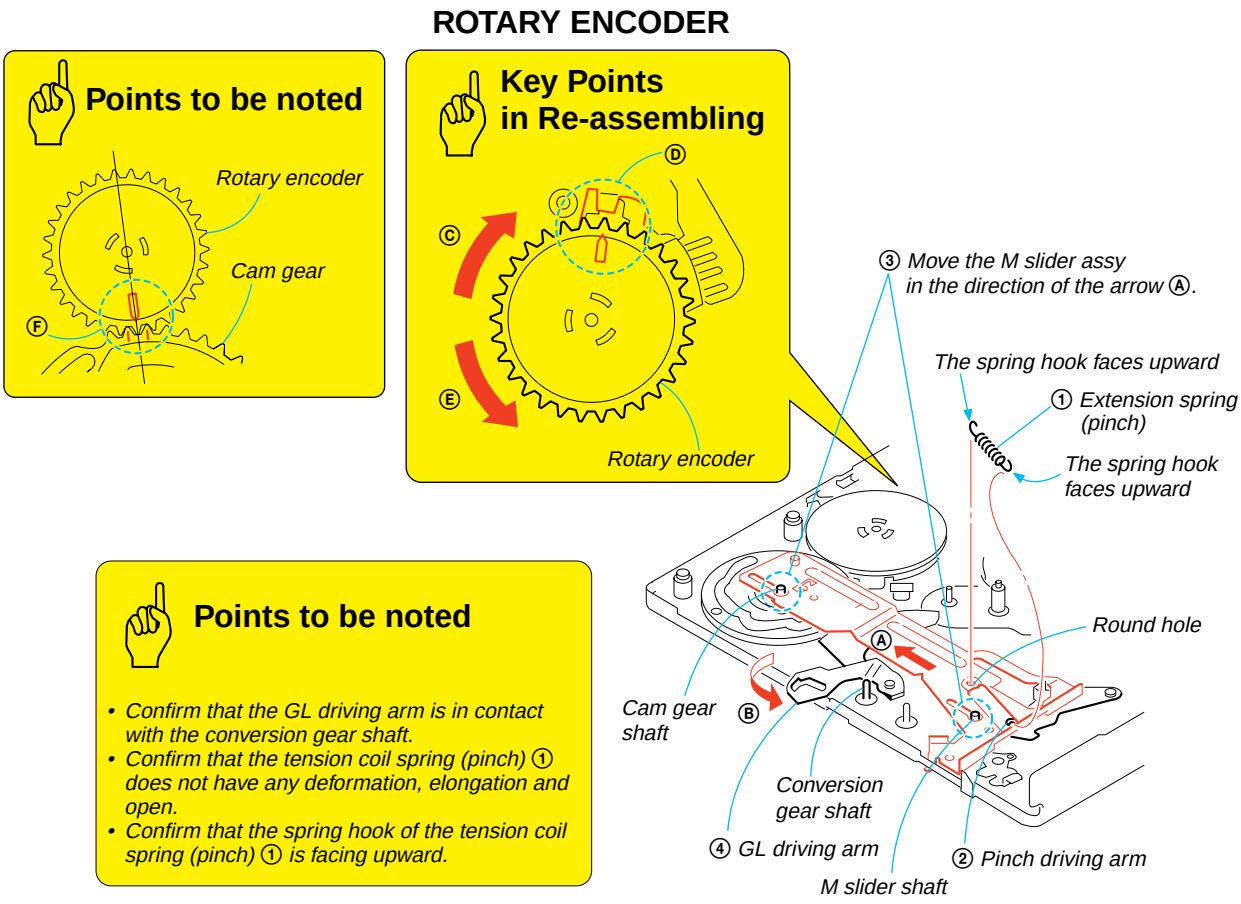
1) Remove an end of the tension spring (pinch) ① from the round hole of the M slider.
2) Remove another end of the tension spring (pinch) ① from the pinch driving arm ②.
3) Rotate the rotary encoder in the direction of the arrow Ⓔ, and align the ▲ mark of ratary encoder with the tooth bottom between second and third teeth Ⓕ. Move by hand in the direction of the arrow Ⓐ until the cam gear shaft and M slider shaft match with the shaft hole of the M slider assy ③.
4) Push in the direction of the arrow Ⓑ until the GL driving arm ④ gets in contact with the conversion gear shaft.

(to be continued to next items 5) through 7) on next page)

2. Attachment procedure

(continued from the previous items 1) through 5) on next page)

6) Move the conversion gear shaft in the direction opposite tot he arrow mark Ⓑ as far as it can go.
7) Rotate the rotary encoder in the direction of the arrow Ⓒ until the ▲ mark arrives at the position Ⓓ.
8) Install an end of the tension coil spring (pinch) ① on the pinch driving arm ② (in the way that spring hook faces upward).
9) Install another end of the tension coil spring (pinch) ① on the round hole of the M slider (in the way that spring hook faces upward).


ROTARY ENCODER
Points to be noted
Rotary encoder
Cam gear
Ⓕ
Key Points in Re-assembling
Ⓓ
Ⓒ
Ⓔ
Rotary encoder
③ Move the M slider assy in the direction of the arrow Ⓐ.
The spring hook faces upward
① Extension spring (pinch)
The spring hook faces upward
Round hole
Cam gear shaft
Ⓑ
Conversion gear shaft
④ GL driving arm
② Pinch driving arm
M slider shaft
Points to be noted
• Confirm that the GL driving arm is in contact with the conversion gear shaft.
• Confirm that the tension coil spring (pinch) ① does not have any deformation, elongation and open.
• Confirm that the spring hook of the tension coil spring (pinch) ① is facing upward.

3-30. M Slider Assy (2)

1. Removal procedure

(continued from the previous items 1) through 5) on previous page)

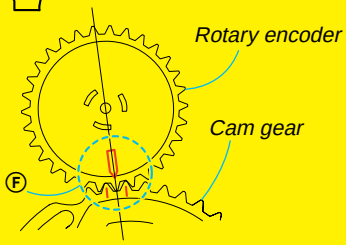
5) Remove the cam gear shaft and the M slider shaft from the two shaft holes Ⓐ of the M slider assy ①.
6) Remove the top tip Ⓑ of the M slider assy ① from the notch of the mechanical chassis in the direction of the arrow.
7) Remove the M slider assy ①.

2. Attachment procedure

1) Apply grease to the cam gear shaft and the M slider shaft (neck groove of the shaft where the M slider slides).
   Amount of grease: a ball of 1.0 mm diameter of grease
2) Align the hole of the pinch driving arm and the hole of the mechanical chassis.
3) Insert the top tip Ⓑ of the M slider assy ① into the notch of the mechanism chassis, and at the same time install the M slider assy ① into the GL driving arm.
4) Align the ▲ mark of rotary encoder with the tooth bottom between second and third teeth Ⓕ.
5) Install the cam gear shaft and the M slider shaft into the tow shaft holes Ⓐ of the M slider assy.

(to be continued to next items 6) through 9) on previous page)

Points to be noted



M SLIDER ASSY

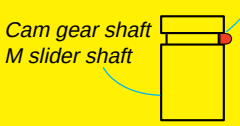
Key Points in Re-assembling

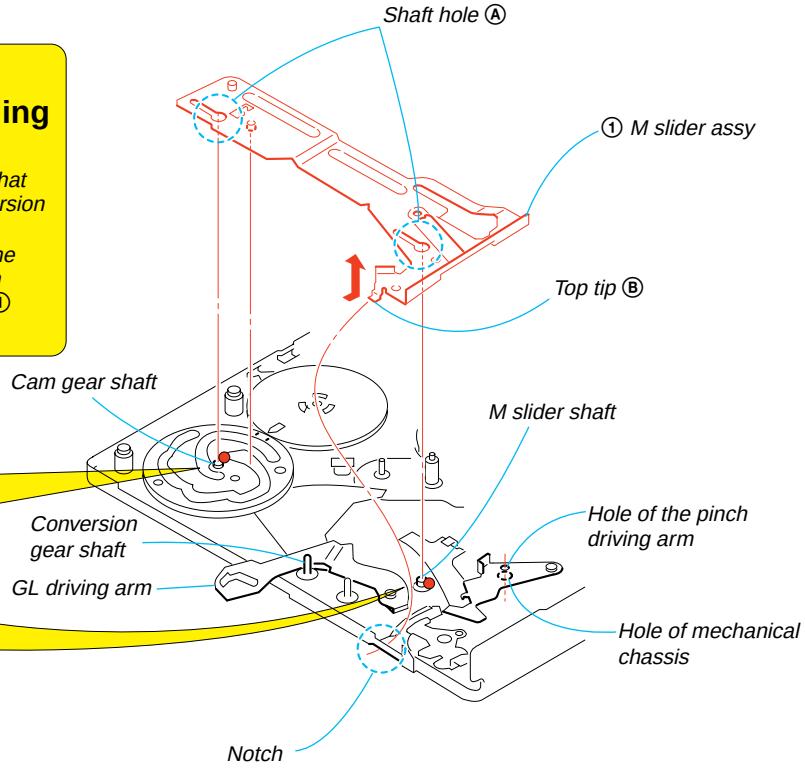
- *When installing the M slider assy ①, confirm that the GL driving arm is in contact with the conversion gear shaft.*
- *Confirm that you have not forgotten to insert the top tip Ⓑ of the M slider assy ① into the notch of the mechanical chassis. The M slider assy ① should not have any deformation.*

Apply Grease

Points to be noted

Apply grease when installing it
Amount of grease: a ball of 1.0 mm diameter of grease
Neck groove of the shaft where the M slider slides





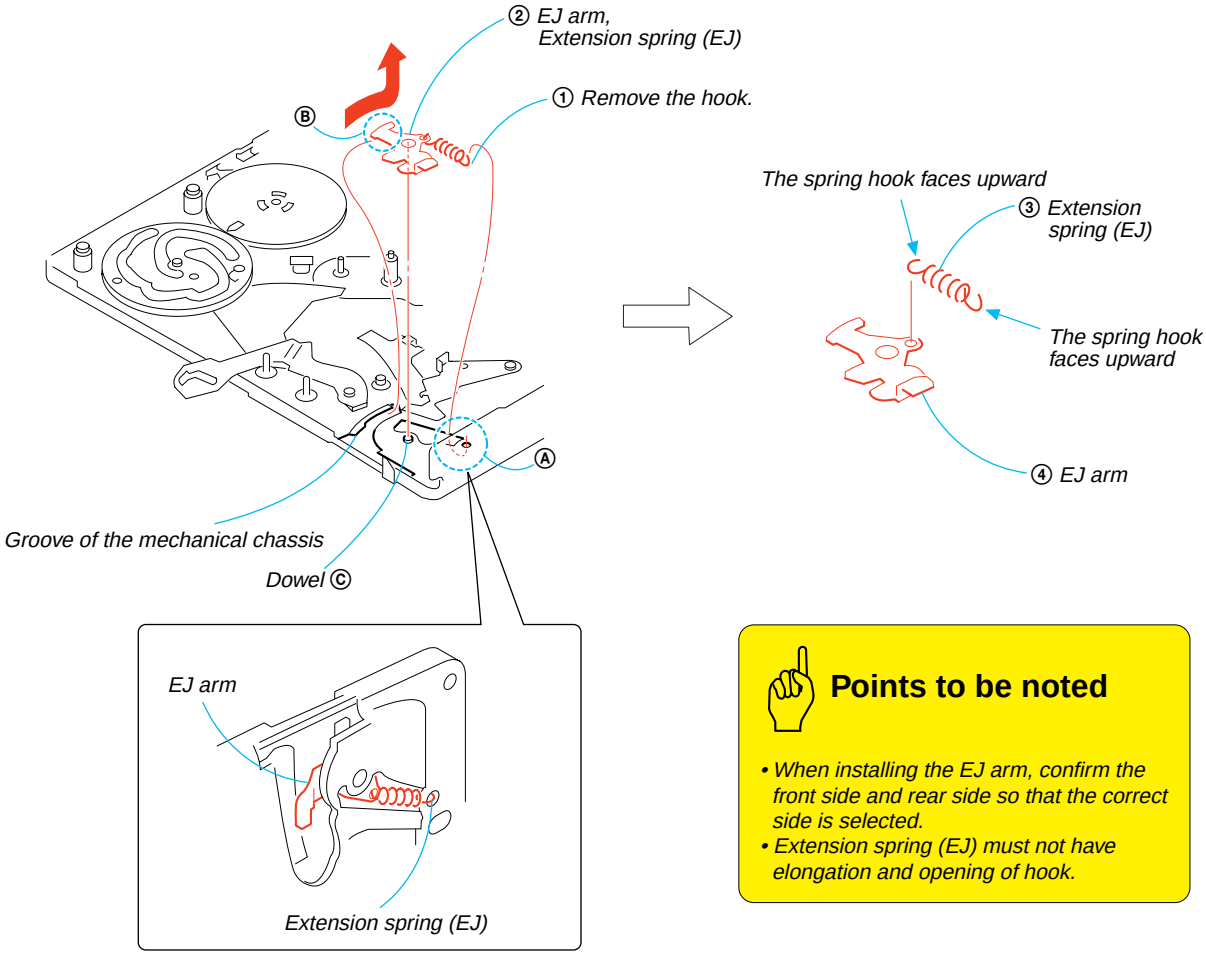
3-31. EJ Arm

1. Removal procedure

1) Remove the hook ① of the tension coil spring (EJ arm) ③ that is hooked on the round hole Ⓐ.
2) Remove the EJ arm and the tension coil spring (EJ arm) ② all together in the direction of the arrow.
3) Remove the tension coil spring (EJ arm) ③ from the EJ arm ④.

2. Attachment procedure

1) Install the tension coil spring (EJ arm) ③ into the round hole of the EJ arm ④ with the hook facing upward.
2) Insert the top tip (bent) portion Ⓑ of the EJ arm ④ into the groove of the mechanical chassis. Insert the dowel Ⓒ into the round hole of the EJ arm.
3) Insert he tension coil spring ① into the round hole Ⓐ of the mechanical chassis with the hook facing upward.



Points to be noted

- *When installing the EJ arm, confirm the front side and rear side so that the correct side is selected.*
- *Extension spring (EJ) must not have elongation and opening of hook.*

3-32. Cam Gear and GL Driving

1. Removal procedure

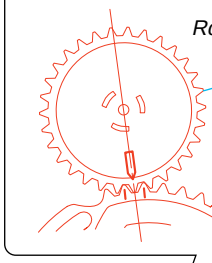
1) Rotate the GL driving arm Ⓗ block assy in the direction of the arrow Ⓘ until it contacts with the conversion gear shaft.
2) Remove the cam gear ②.
3) Remove the GL driving arm ③.

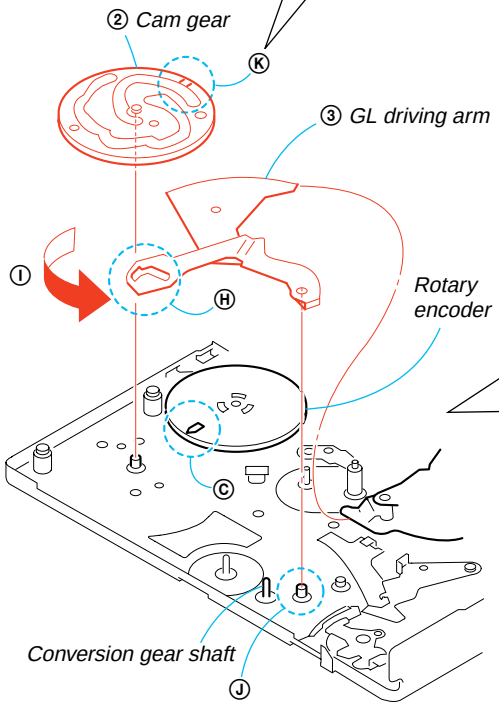
2. Attachment procedure

1) Insert the GL driving arm ③ into the shaft Ⓙ of the mechanical chassis and rotate the GL driving arm Ⓗ block assy in the direction of the arrow Ⓘ until it contacts with the conversion gear shaft.
2) Confirm the front side and rear side of the cam gear ② so that the correct side is selected. Install the cam gear ② while matching phase of the ▲ mark Ⓒ with the second tooth valley Ⓚ and the third tooth valley Ⓚ of the cam gear.
3) Apply grease to the specified locations Ⓐ to Ⓖ of the cam gear.

Matching Phase

Key Points in Re-assembling



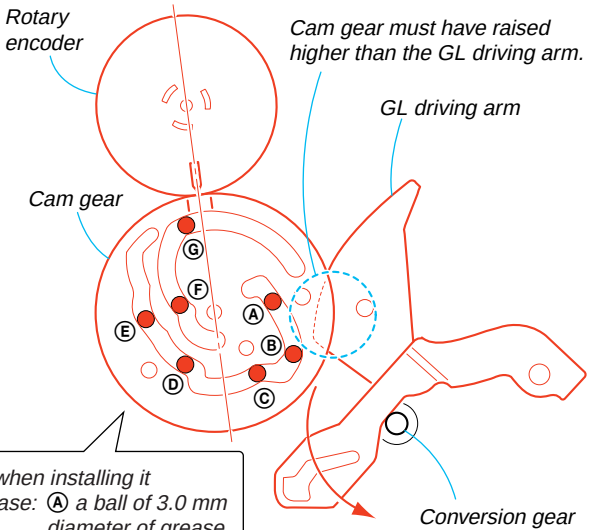


Points to be noted

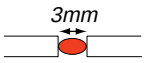
- *Confirm that the phase of the cam gear and that of the rotary encoder are matched and in phase.*
- *Confirm that the cam gear overrides on the GL driving arm.*
- *Confirm that the GL driving arm is contact with the conversion shaft.*
- *Do not apply grease to any locations other than the specified location. Apply grease of the specified amount.*

Notes When Applying Grease and During Installation

Key Points in Re-assembling



Apply grease when installing it
Amount of grease: Ⓐ a ball of 3.0 mm diameter of grease Ⓑ to Ⓖ a ball of 2.0 mm diameter of grease



Sides of the both grooves

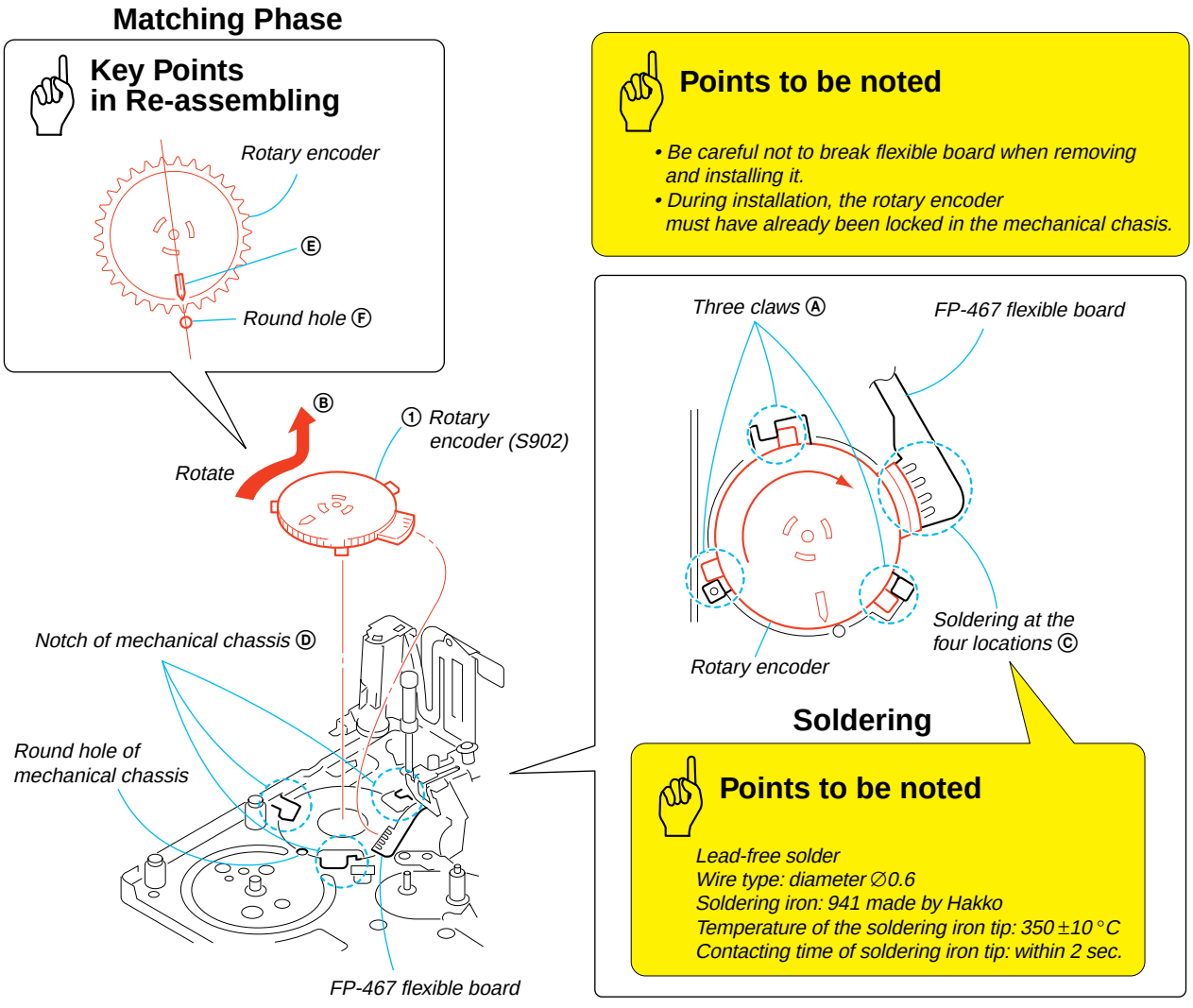
3-33. Rotary Encoder (S902)

1. Removal procedure

1) Remove the three claws Ⓐ of the rotary encoder (S902) ① from the three notches of the mechanical chassis.
2) Rotate the rotary encoder (S902) ① in the direction of the arrow Ⓑ and remove.
3) Remove soldering (at the four locations) Ⓒ to which the rotary encoder (S902) is attached.

2. Attachment procedure

1) Make soldering (at the four locations) Ⓒ so that the rotary encoder (S902) ① is connected to the FP-467 flexible board.
2) Place the rotary encoder (S902) ① on top of the notch Ⓓ of the mechanical chassis. Lock the three claws Ⓐ of the rotary encoder (S902) ① into the notches Ⓓ of the mechanical chassis.
3) Match the phase of the ▲ mark Ⓔ of the rotary encoder (S902) ① with the phase of the round hole Ⓕ of the mechanical chassis.


Matching Phase
Key Points in Re-assembling
Rotary encoder
Ⓔ
Round hole Ⓕ
Ⓑ
① Rotary encoder (S902)
Rotate
Notch of mechanical chassis Ⓓ
Round hole of mechanical chassis
FP-467 flexible board
Points to be noted
• Be careful not to break flexible board when removing and installing it.
• During installation, the rotary encoder must have already been locked in the mechanical chasis.
Three claws Ⓐ
FP-467 flexible board
Soldering at the four locations Ⓒ
Rotary encoder
Soldering
Points to be noted
Lead-free solder
Wire type: diameter ∅0.6
Soldering iron: 941 made by Hakko
Temperature of the soldering iron tip: 350 ±10 °C
Contacting time of soldering iron tip: within 2 sec.

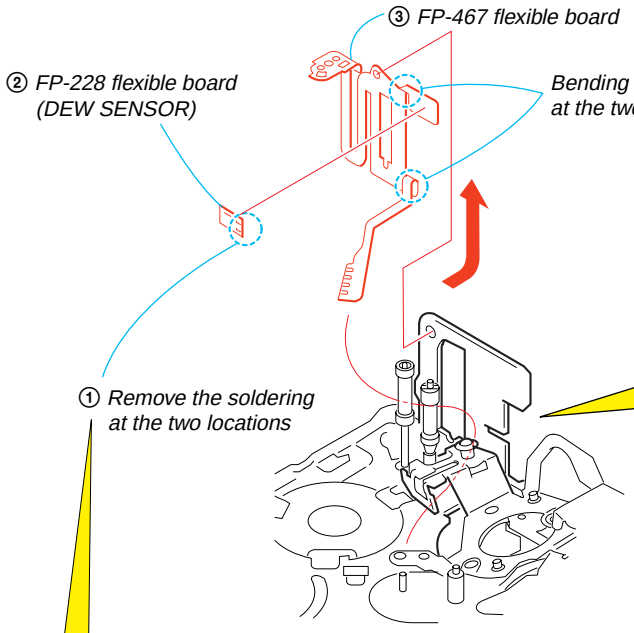
3-34. FP-228 Flexible Board (DEW SENSOR) and FP-467 Flexible Board

1. Removal procedure

1) Remove the soldering at the two locations ① and remove the FP-228 flexible board (DEW SENSOR) ②.
2) Remove the FP-467 flexible board ③ from the mechanical chassis in the direction of the arrow.

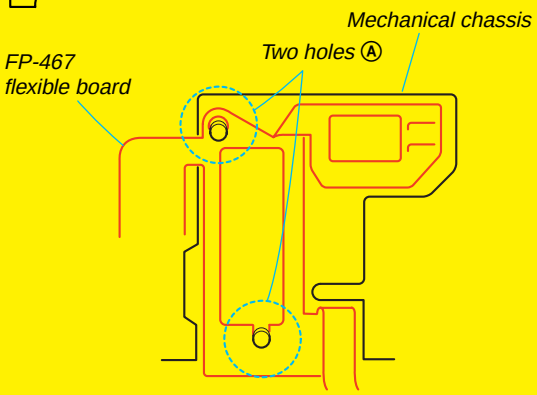
2. Attachment procedure

1) Match the phase of the two holes Ⓐ of the FP-467 flexible board ③ with the holes of the mechanical chassis, and attach them each other.
2) Attach the FP-228 flexible board (DEW SENSOR) ② to the FP-467 flexible board ③.
3) Connect the terminals at the two locations ① by soldering.


③ FP-467 flexible board
② FP-228 flexible board (DEW SENSOR)
Bending the flexible board at the two locations
① Remove the soldering at the two locations

FP-467 FLEXIBLE BOARD

Key Points in Re-assembling



Soldering

Points to be noted

Lead-free solder
Temperature of the soldering iron tip: 350 °C
Contacting time of soldering iron tip: within 2 sec.

- *Be careful not to create the hollow soldering, Br, and there must be no lacking of parts. There must not be solder ball.*
- *Be careful not to contact the soldering iron tip too long time.*

Points to be noted

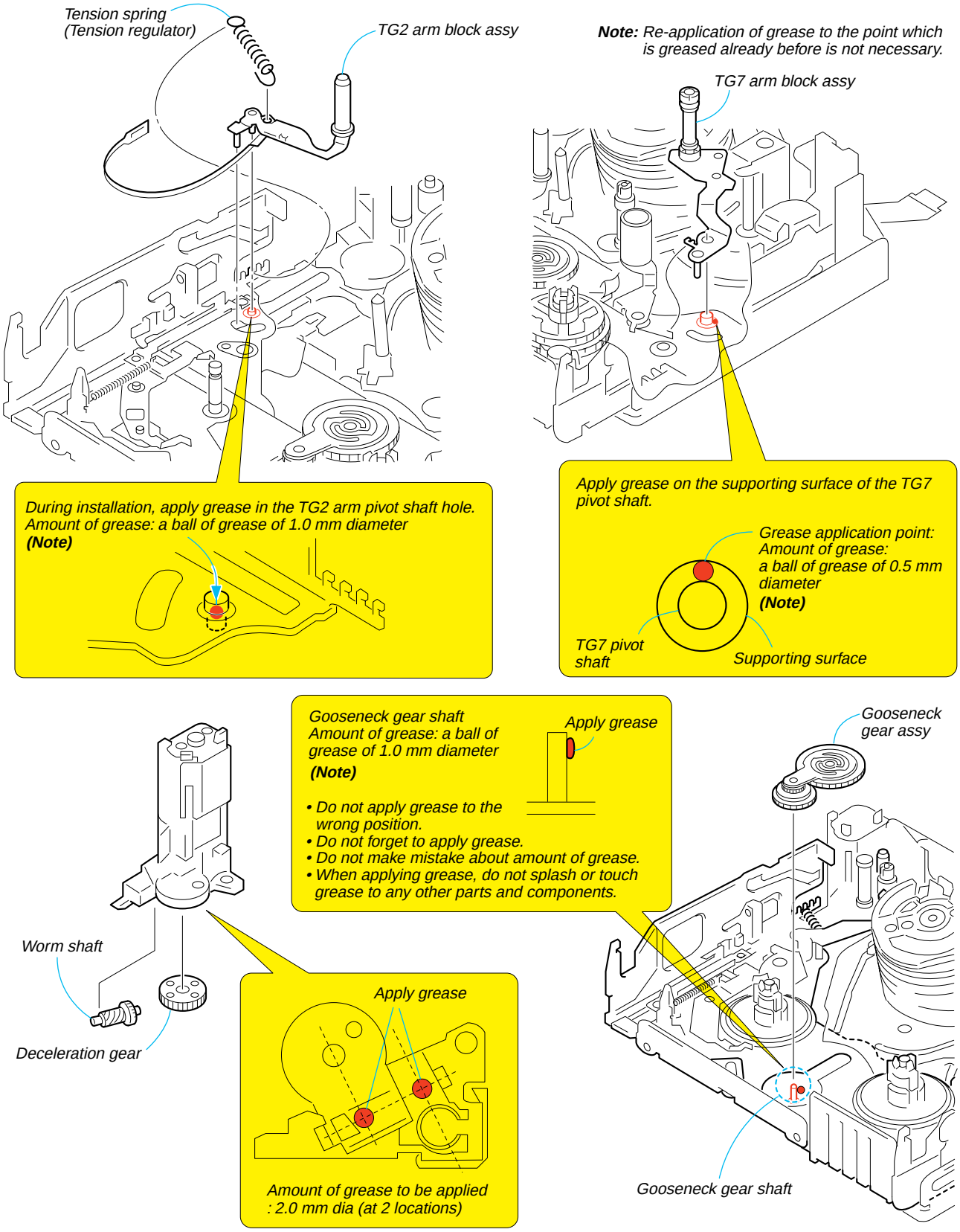
- *Be careful not to break the flexible board to have open circuit when installing and removing it.*
- *Be careful that flexible board must not override on anything.*
- *Be careful that the two bending portions of the FP-467 flexible board must not be bent excessively that results in open circuit and breakdown of flexible board.*
- *Do not rub the DEW sensor with any rubbing bars.*

2003.01.30

HELP

Application of grease, soldering method and precautions, and phase matching adjustment are compiled and below.

Apply grease (1)

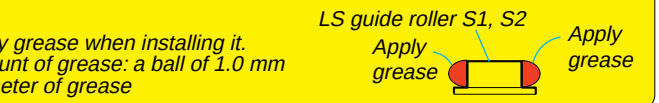

Tension spring
(Tension regulator)
TG2 arm block assy
Note: Re-application of grease to the point which is greased already before is not necessary.
TG7 arm block assy
During installation, apply grease in the TG2 arm pivot shaft hole.
Amount of grease: a ball of grease of 1.0 mm diameter
(Note)
Apply grease on the supporting surface of the TG7 pivot shaft.
Grease application point:
Amount of grease:
a ball of grease of 0.5 mm diameter
(Note)
TG7 pivot shaft
Supporting surface
Gooseneck gear shaft
Amount of grease: a ball of grease of 1.0 mm diameter
(Note)
Apply grease
• Do not apply grease to the wrong position.
• Do not forget to apply grease.
• Do not make mistake about amount of grease.
• When applying grease, do not splash or touch grease to any other parts and components.
Gooseneck gear assy
Worm shaft
Deceleration gear
Apply grease
Amount of grease to be applied
: 2.0 mm dia (at 2 locations)
Gooseneck gear shaft

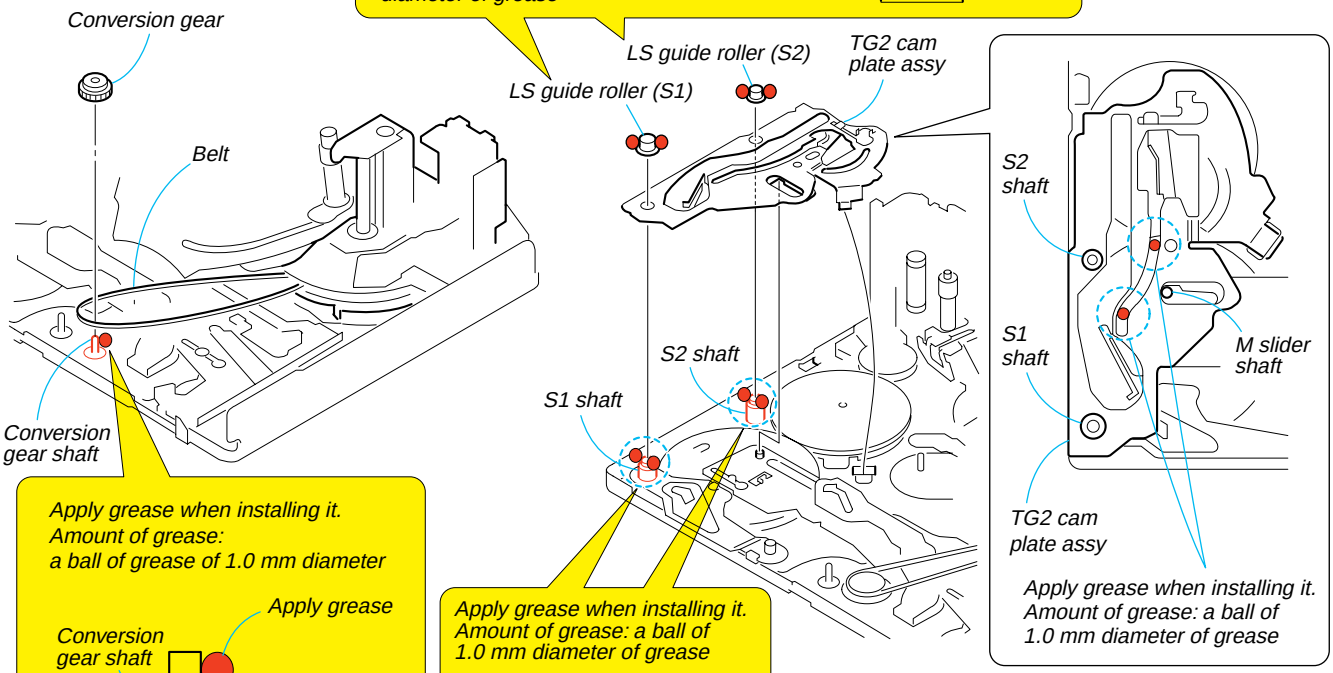
Apply grease (2)

Apply Grease

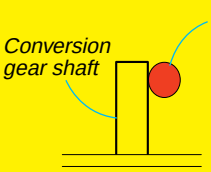
Points to be noted

Apply grease when installing it.
Amount of grease: a ball of 1.0 mm diameter of grease



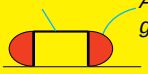


Apply grease when installing it.
Amount of grease:
a ball of grease of 1.0 mm diameter



Apply grease when installing it.
Amount of grease: a ball of 1.0 mm diameter of grease

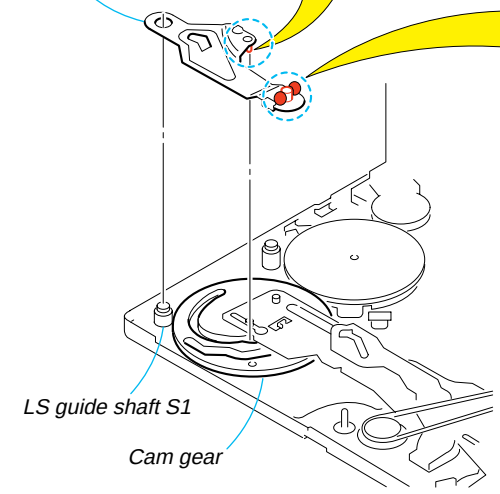
S1 shaft, S2 shaft



Apply grease when installing it.
Amount of grease: a ball of 1.0 mm diameter of grease

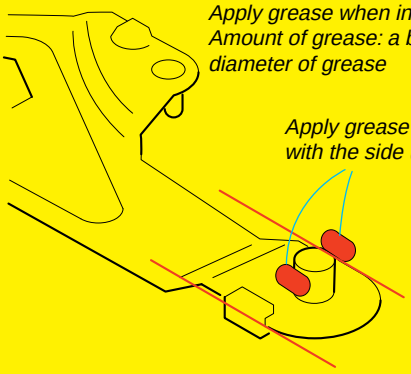
Apply grease when installing it.
Amount of grease: a ball of 1.0 mm diameter of grease

LS arm shaft

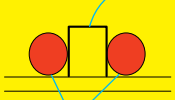


Apply grease when installing it.
Amount of grease: a ball of 1.0 mm diameter of grease

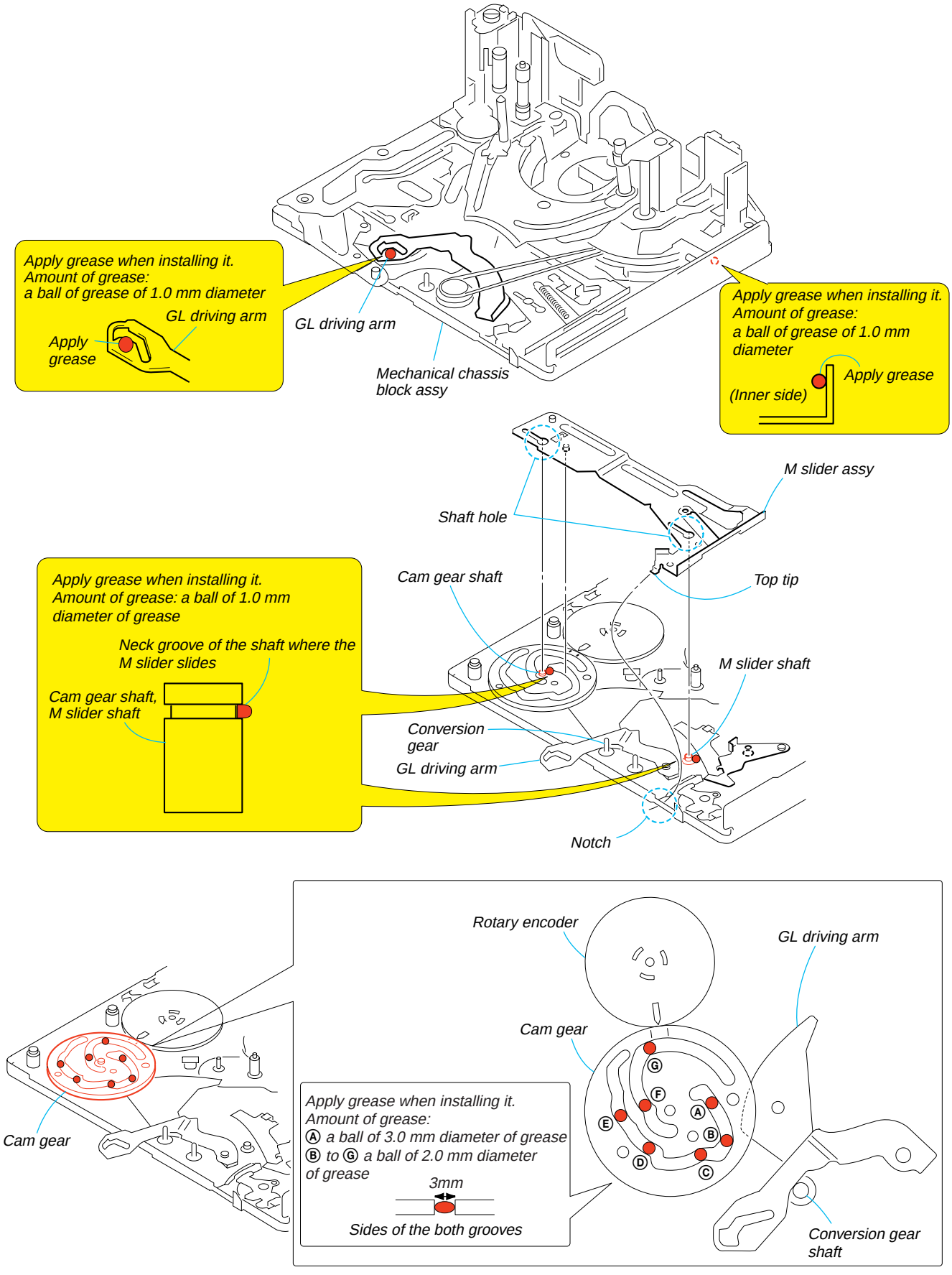
Apply grease in parallel with the side (red line)



LS arm shaft



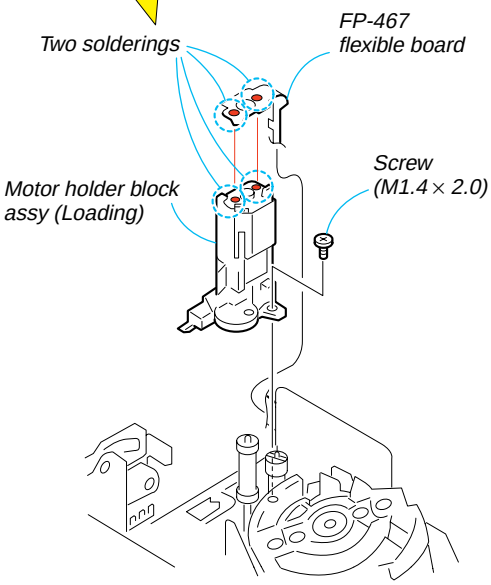
Apply grease (3)

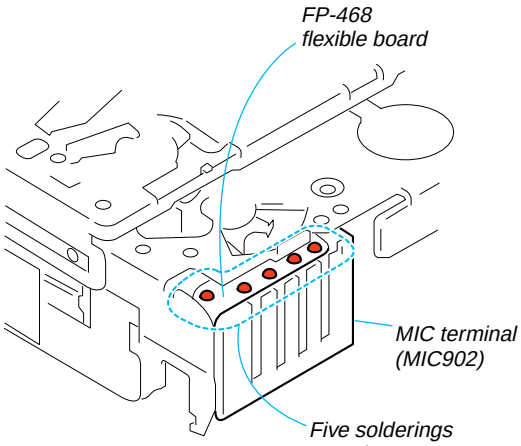

Apply grease when installing it.
Amount of grease:
a ball of grease of 1.0 mm diameter
GL driving arm
Apply grease
GL driving arm
Mechanical chassis block assy
Apply grease when installing it.
Amount of grease:
a ball of grease of 1.0 mm diameter
Apply grease
(Inner side)
M slider assy
Shaft hole
Top tip
Cam gear shaft
M slider shaft
Apply grease when installing it.
Amount of grease: a ball of 1.0 mm diameter of grease
Neck groove of the shaft where the M slider slides
Cam gear shaft, M slider shaft
Conversion gear
GL driving arm
Notch
Rotary encoder
GL driving arm
Cam gear
Cam gear
Apply grease when installing it.
Amount of grease:
Ⓐ a ball of 3.0 mm diameter of grease
Ⓑ to Ⓖ a ball of 2.0 mm diameter of grease
3mm
Sides of the both grooves
Conversion gear shaft

Soldering (1)

Lead-free solder
Wire type : ∅0.6
Temperature of the soldering iron tip : 320 °C
Contacting time of soldering iron tip : within 2 sec.

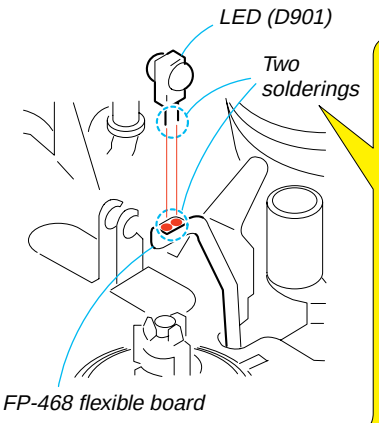
- Be careful not to create the hollow soldering, Br, and there must be no lacking of parts.
- Be careful not to melt the detent of the holder.
- Be careful not to melt the END cover.
- Be careful not to break the terminals due to attaching the soldering iron too long time.



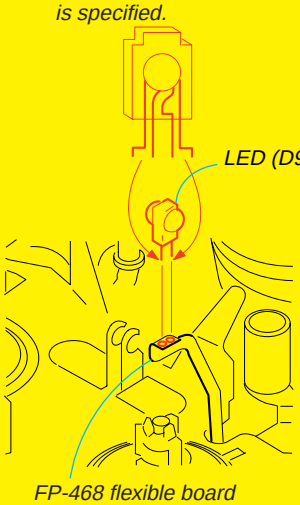


Use the rubber finger tip cover
Lead-free solder
Wire type : ∅0.6
Soldering iron : 941 made by Hakko
Soldering iron tip : T1-1BC

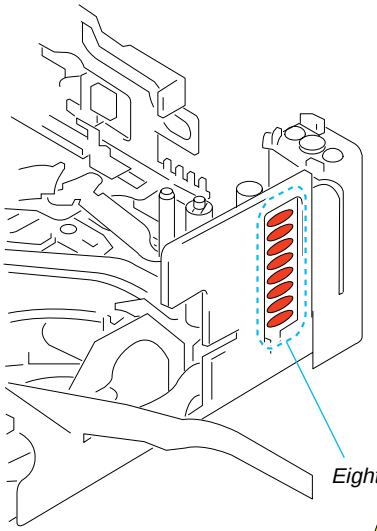
Temperature of the soldering iron tip : 300 ±10 °C
Contacting time of soldering iron tip : within 2 sec



Direction of the terminal is specified.



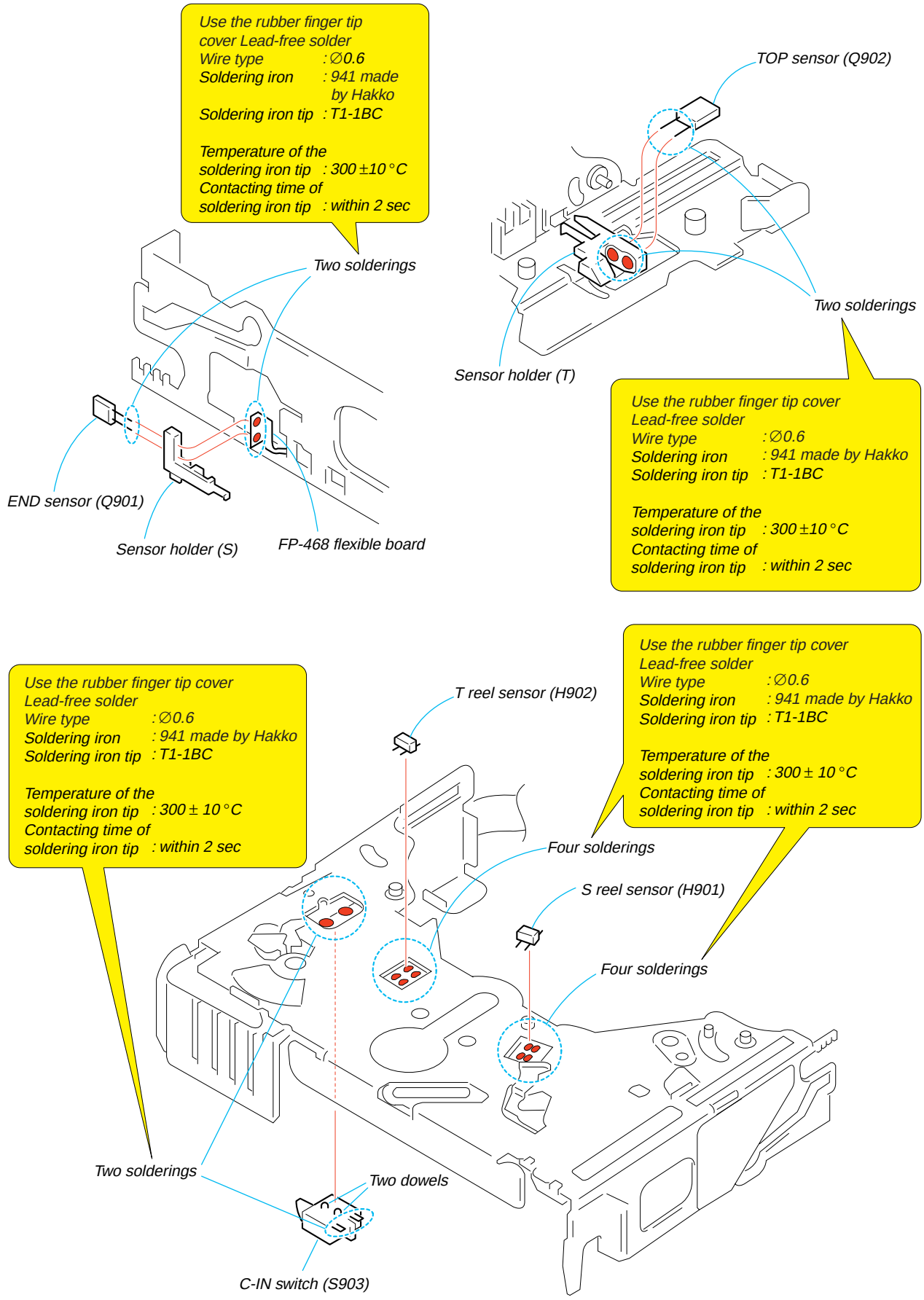
Rubber finger tip protection cover must be used.
Lead-free solder
Wire type: diameter ∅0.6
Soldering iron: 941 made by Hakko
Soldering iron tip: T1-1BC
Temperature of the soldering iron tip: 300 ±10 °C
Contacting time of soldering iron tip: within 2 sec.



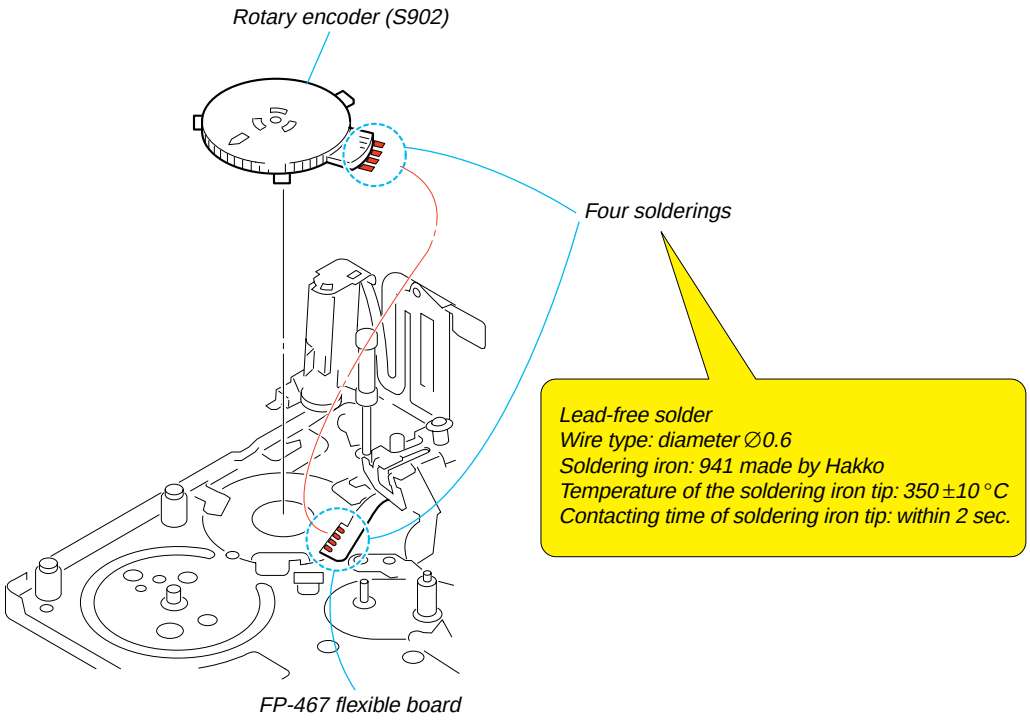
Lead-free solder
Wire type: diameter 0.6 ∅
Temperature of the soldering iron tip: 350 °C
Contacting time of soldering iron tip: within 2 sec.

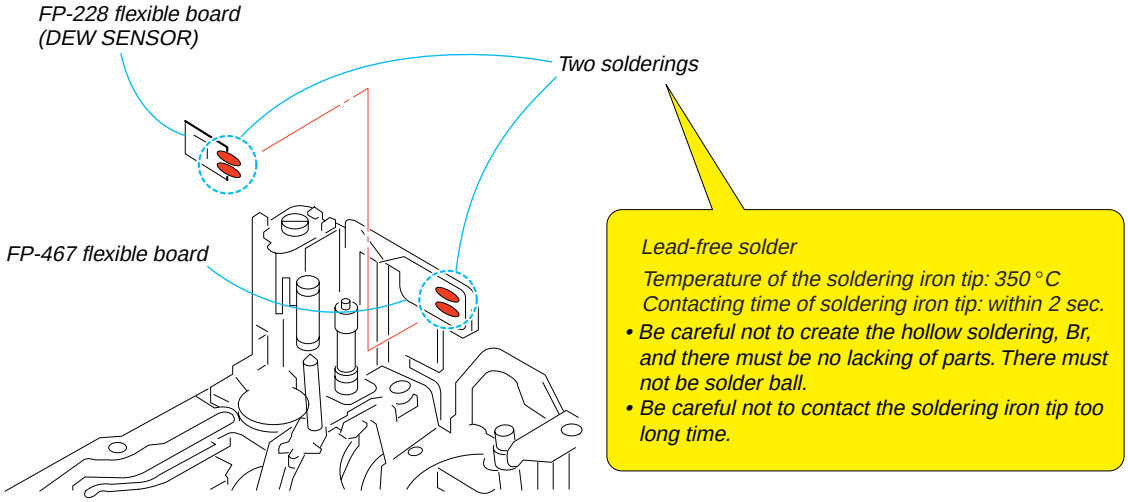
- Be careful not to create the hollow soldering, Br, and there must be no lacking of parts.
- Be careful not to crash the grip jog to the TG1 guide.

Soldering (2)

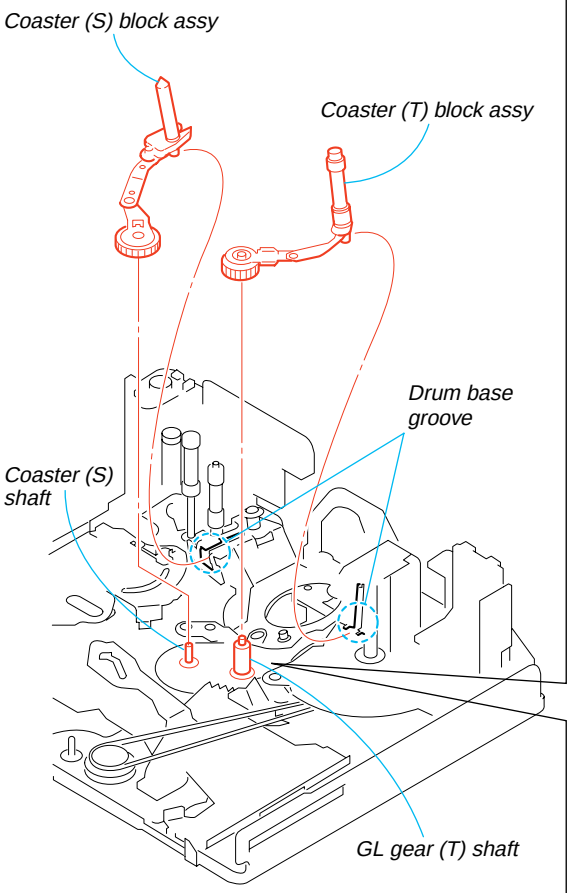

Use the rubber finger tip cover Lead-free solder
Wire type : ∅0.6
Soldering iron : 941 made by Hakko
Soldering iron tip : T1-1BC
Temperature of the soldering iron tip : 300 ±10 °C
Contacting time of soldering iron tip : within 2 sec
Two solderings
END sensor (Q901)
Sensor holder (S)
FP-468 flexible board
TOP sensor (Q902)
Two solderings
Sensor holder (T)
Use the rubber finger tip cover Lead-free solder
Wire type : ∅0.6
Soldering iron : 941 made by Hakko
Soldering iron tip : T1-1BC
Temperature of the soldering iron tip : 300 ±10 °C
Contacting time of soldering iron tip : within 2 sec
Use the rubber finger tip cover Lead-free solder
Wire type : ∅0.6
Soldering iron : 941 made by Hakko
Soldering iron tip : T1-1BC
Temperature of the soldering iron tip : 300 ± 10 °C
Contacting time of soldering iron tip : within 2 sec
T reel sensor (H902)
Four solderings
S reel sensor (H901)
Four solderings
Two solderings
Two dowels
C-IN switch (S903)

Soldering (3)

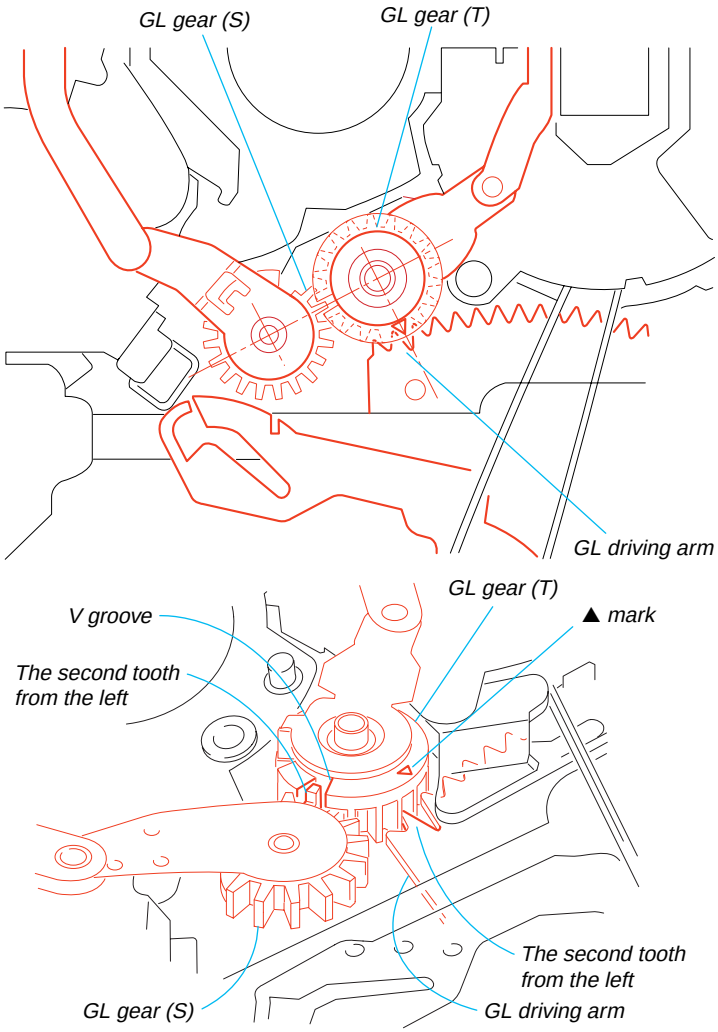

Rotary encoder (S902)
Four solderings
Lead-free solder
Wire type: diameter ∅0.6
Soldering iron: 941 made by Hakko
Temperature of the soldering iron tip: 350 ±10 °C
Contacting time of soldering iron tip: within 2 sec.
FP-467 flexible board


FP-228 flexible board
(DEW SENSOR)
Two solderings
FP-467 flexible board
Lead-free solder
Temperature of the soldering iron tip: 350 °C
Contacting time of soldering iron tip: within 2 sec.
• Be careful not to create the hollow soldering, Br, and there must be no lacking of parts. There must not be solder ball.
• Be careful not to contact the soldering iron tip too long time.

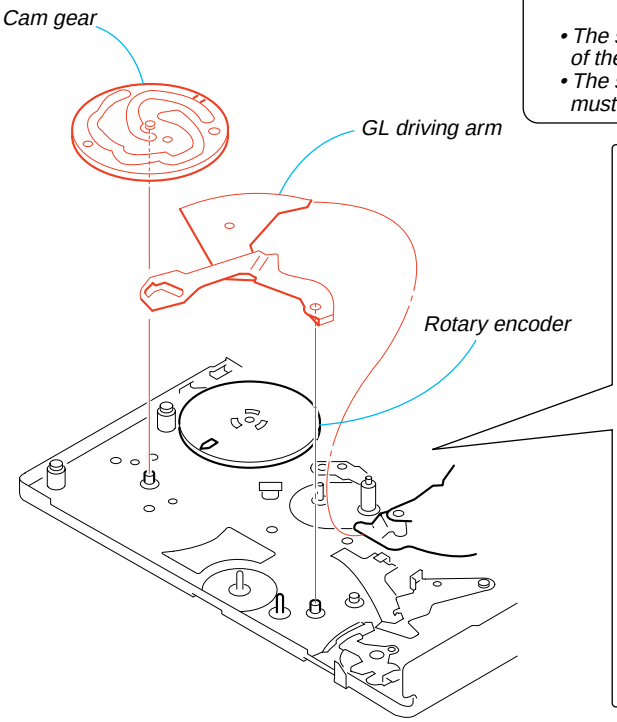
Matching Phase

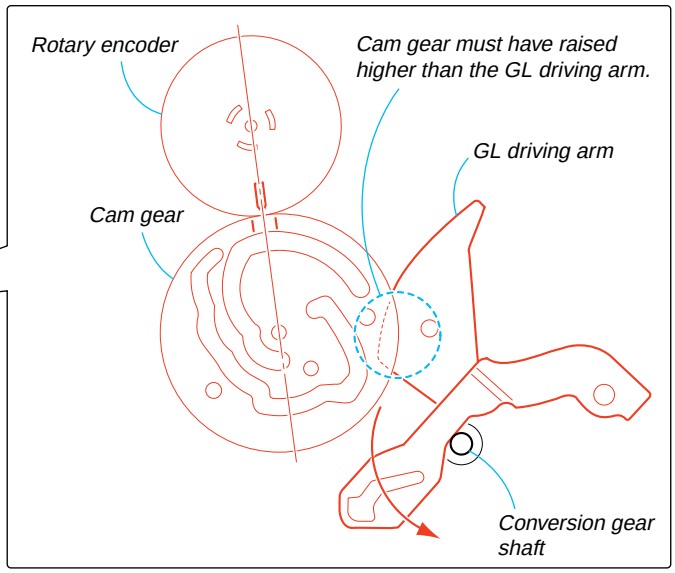


When re-assembling, adjust the gear phase at the three positions.



- The second tooth from the left of the GL gear (S) and the V-groove of the GL gear (T) must be in phase.
- The second tooth from the left of the GL drive arm and the ▲ mark must be in phase.





4. Adjustment

4-1. FWD Position Adjustment

When the TG2 arm block assy or the band adjuster or the S reel table assy is replaced or removed, the following adjustment becomes necessary.

- TG2 FWD Position Adjustment (Refer to section 4-4.)
- FWD Back Tension Adjustment (Refer to section 4-4.)
- Reel Table (RVS) Check (Refer to section 4-2.)

1) Set the R/P mode and check the TG2 guide position as follows.
   - Confirm that the distance between the TG2 guide and the L motor is 1.0 mm. If not, perform adjustment as follows.
2) Loosen the fixing screw. Use the adjustment screwdriver (Ref No. J-8) and adjust the band adjuster for the distance of 1.0 mm between the TG2 guide and the L motor. Upon completion of adjustment, tighten the fixing screw securely as follows.
   Tightening torque: 0.059 ± 0.01 N•m (0.6 ± 0.1 kgf•cm)
   Note: Upon completion of adjustment, confirm that TG2 can move with some margin in the direction of the arrow Ⓐ.

4-2. Reel Torque Check

1. Check Procedure

[FWD torque]

1) Set the mini DV torque cassette (Ref. No. J-6).
2) Establish the FWD mode. Confirm that the center value of the T reel table torque value is in the range of 0.49 to 0.93 (mN•m) (5.0 to 9.5 g•cm) within deviation of 0.39 (mN•m) (4.0 g•cm)

[RVS torque]

1) Set the mini DV torque cassette (Ref. No. J-6).
2) Establish the RVS mode. Confirm that the center value of the S reel table torque value is in the range of 1.57 to 2.45 (mN•m) (16.0 to 25.0 g•cm)

If the above specification is not satisfied, check the tension regulator band for correct operation. If operation of the tension regulator band has no problem, replace the respective reel tables.

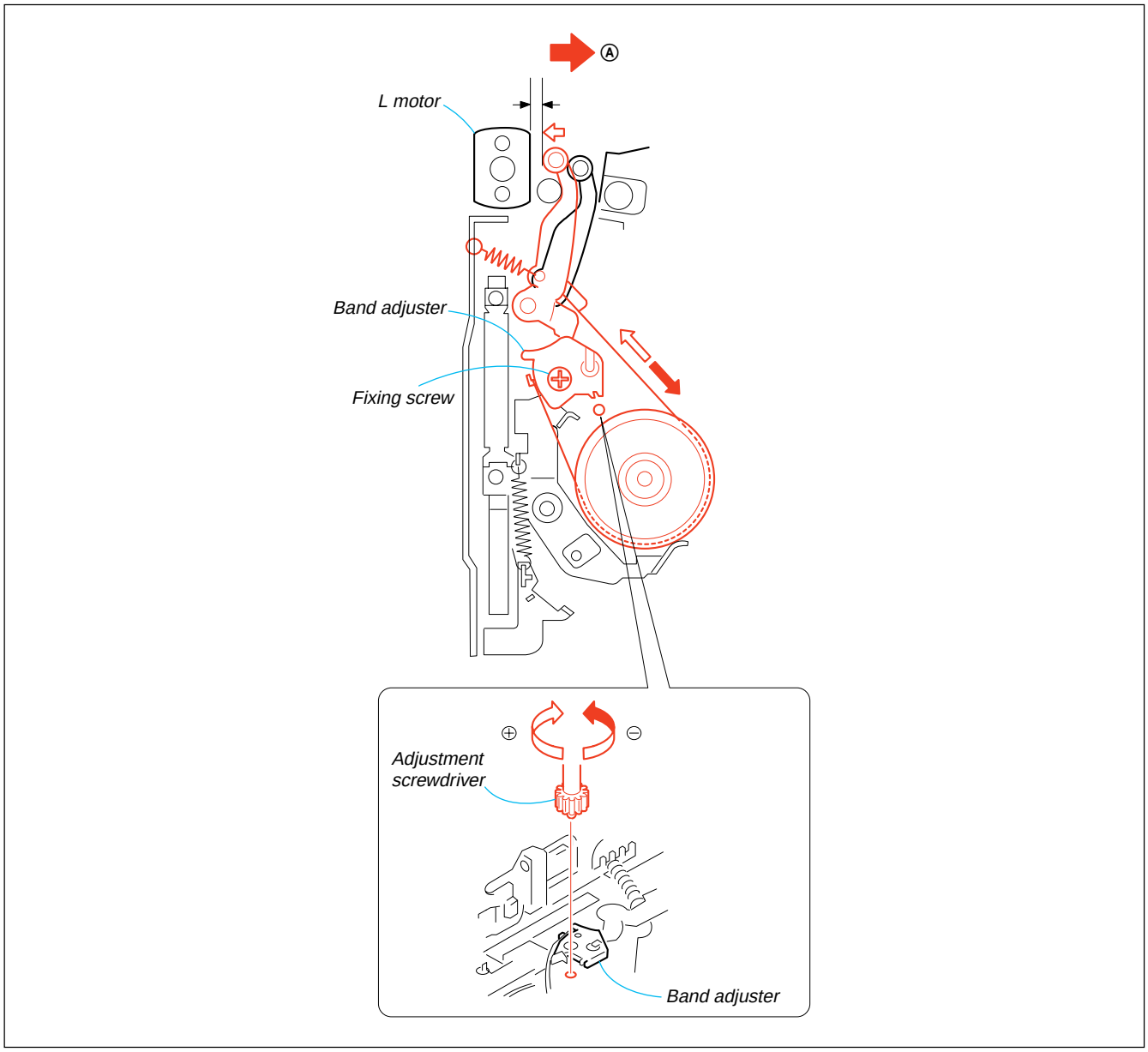


Fig. 4-1

4-3. LS Cam Plate Position Adjustment

1. Adjustment Procedure

1) Loosen the LS cam plate fixing screw (special head screw M1.4 × 1.4) by 180 degrees.
2) Set the STOP mode.
3) While pressing the center of the LS chassis block with the force of 1.5 ± 0.5 N (150 gf ± 50 gf), move the LS cam plate toward the S reel side with the force of 0.147 ± 0.01 N•m (2300 gf ± 200 gf) and tighten the LS cam plate fixing screw (special head screw M1.4 × 1.4) ①.
   Tightening torque: 0.098 ± 0.01 N•m (1.0 ± 0.1 kgf•cm)

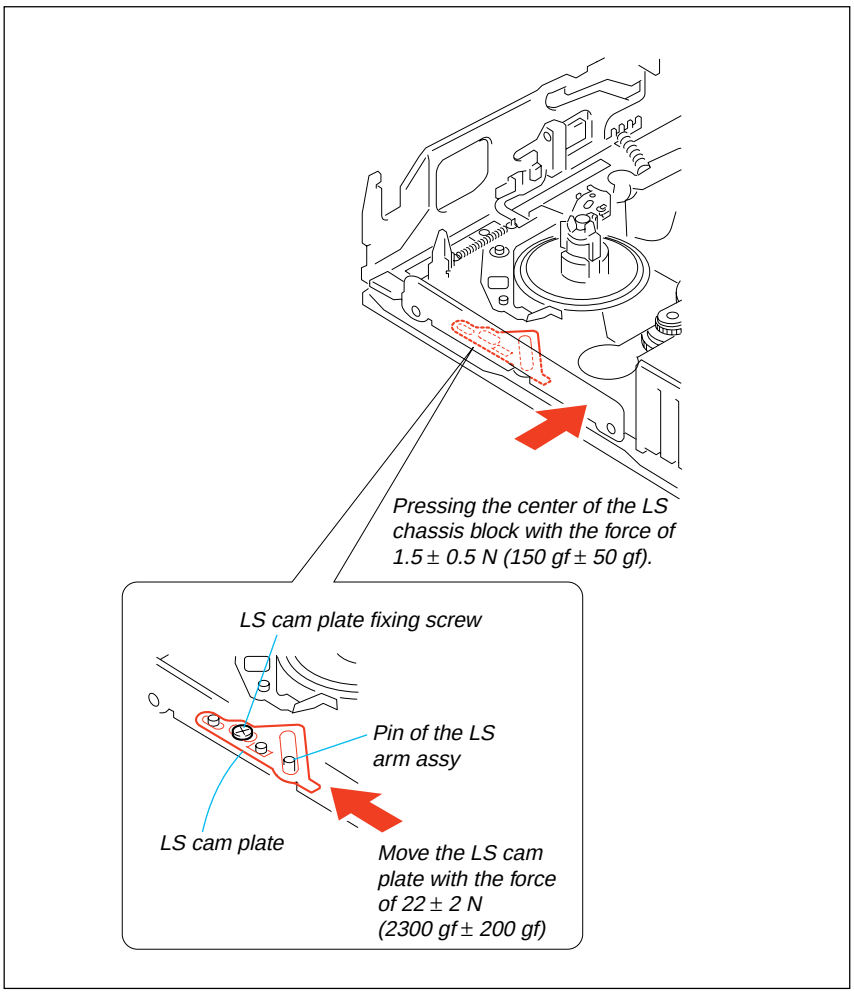

Pressing the center of the LS chassis block with the force of 1.5 ± 0.5 N (150 gf ± 50 gf).
LS cam plate fixing screw
Pin of the LS arm assy
LS cam plate
Move the LS cam plate with the force of 22 ± 2 N (2300 gf ± 200 gf)

Fig. 4-2

4-4. Tape Path Adjustment

4-1. Adjustment Preparation

1) Clean the tape running surface (tape guides, drum, capstan, pinch roller) referring to section 2-2.
2) Connect the adjustment remote commander (Ref. No. J-13) to the LANC terminal of the machine. Set the HOLD switch to ON.
3) Connect an oscilloscope to CN1004 of the VC-312 board via the CPC-7 jig (J-6082-382-A). (In the case of DCR-TRV22K)
   Oscilloscope CH1: VC-312 board CN1004 pin② (Note 1)
   EXT. TRIG: VC-312 board CN1004 pin④
   Note 1: Connect CN1004 pin② and pin⑥ (GND) with a 75-ohm resistor (1-247-804-11).
4) Play back the tracking alignment tape (XH 2-1) (Ref. No. J-5).
5) Select page: 0, address: 10 and set data: 00. (Note 2)
6) Select page: 3, address: 26 and set data: 31, and press the PAUSE button. (Note 2)
7) Select page: 3, address: 33 and set data: 08. (Note 2)
8) Confirm that the RF waveform on the scope is flat at both of the entrance side and the exit side. (Refer to Fig. 4-4A.)
   If the RF waveform is not flat either at the entrance side or the exit side (refer to Fig. 4-4 B and C), perform the adjustment of section 6-2 and later.
9) When the required conditions of step 8) are satisfied, perform [Required Work upon Completion of Adjustment] as described below upon completion of adjustment/check.

[Required Work upon Completion of Adjustment]

1) Connect the adjustment remote commander (Ref. No. J-13) to the LANC terminal of the machine. Set the HOLD switch to ON.
2) Select page: 0, address: 10 and set data: 00. (Note 2)
3) Select page: 3, address: 26 and set data: 00, and press the PAUSE button. (Note 2)
4) Select page: 3, address: 33 and set data: 00. (Note 2)
   Note 2: Page and address numbers differ depending on each model. Please to Service Manual of the respective models. Page and address numbers of DCR-TRV22K are shown in this manual.

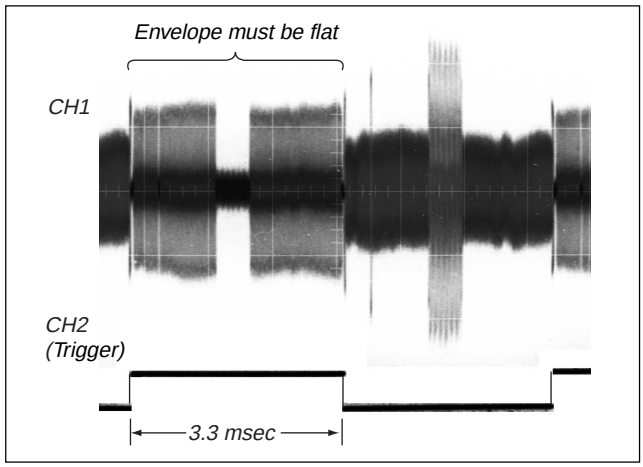


Fig. 4-3

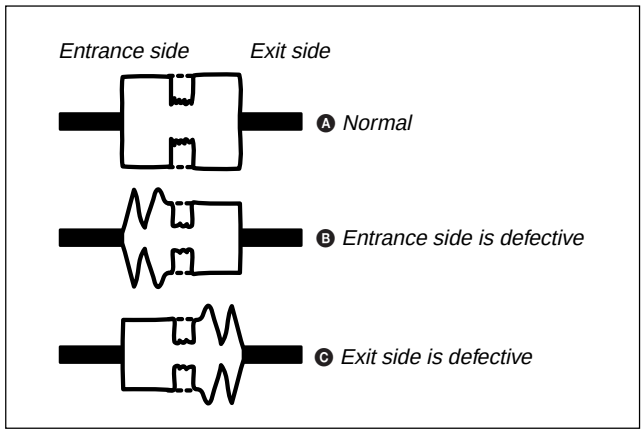


Fig. 4-4

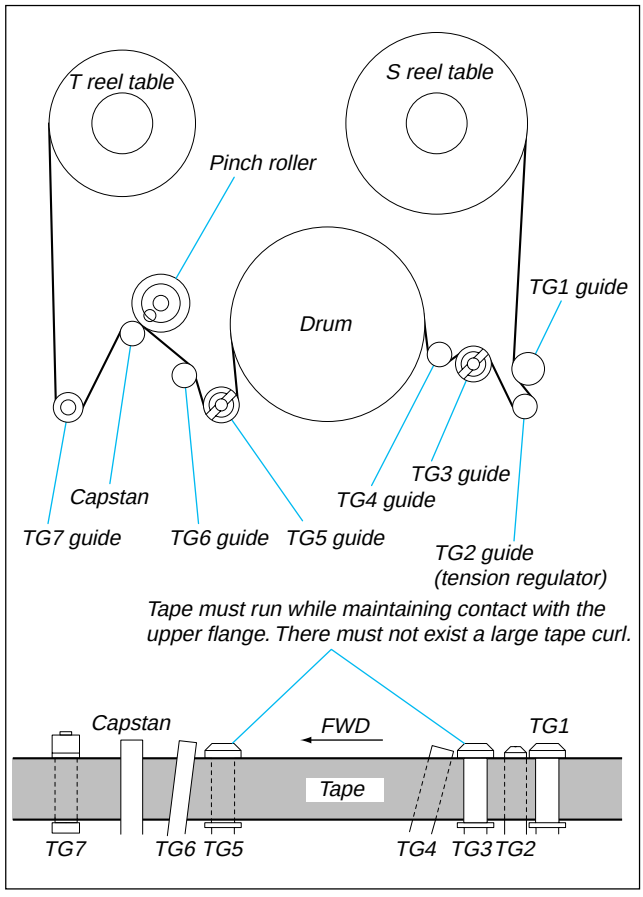


Fig. 4-5

4-2. TG3/TG5 Guide Coarse Adjustment

1) Play back the tracking alignment tape (XH 2-1) (Ref. No. J-5).
2) Adjust the TG3 and TG5 guides until the RF envelope waveform becomes flat. (Refer to Fig. 4-8.)

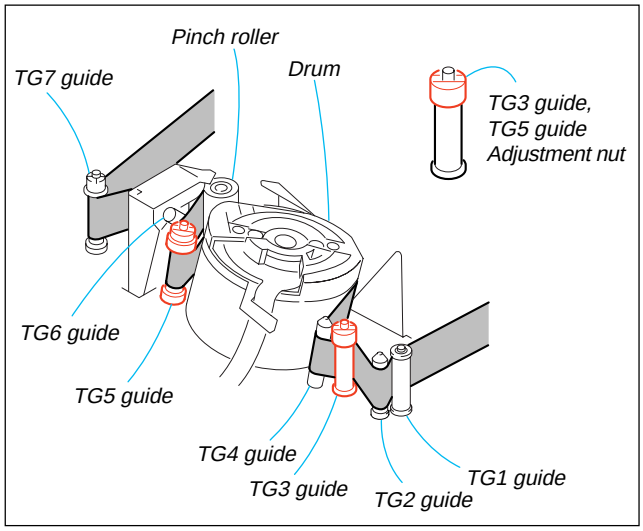


Fig. 4-6

4-3. FWD Back Tension Adjustment

1) Set the mini DV torque cassette (Ref. No. J-6) and establish the FWD mode.
2) Confirm that the S side torque cassette reading value is in the range of 0.2 to 0.3 mN•m (2.0 to 3.0 g•cm) including deviation. If the measurement value does not satisfy the specifications, perform the following adjustment.
   - If the measurement value is higher than the specification: (Decreases the spring tension)
     Move the tension coil spring hook to another spring stay in the direction of Ⓑ.
   - If the measurement value is lower than the specification: (Increases the spring tension)
     Move the tension coil spring hook to another spring stay in the direction of Ⓐ.

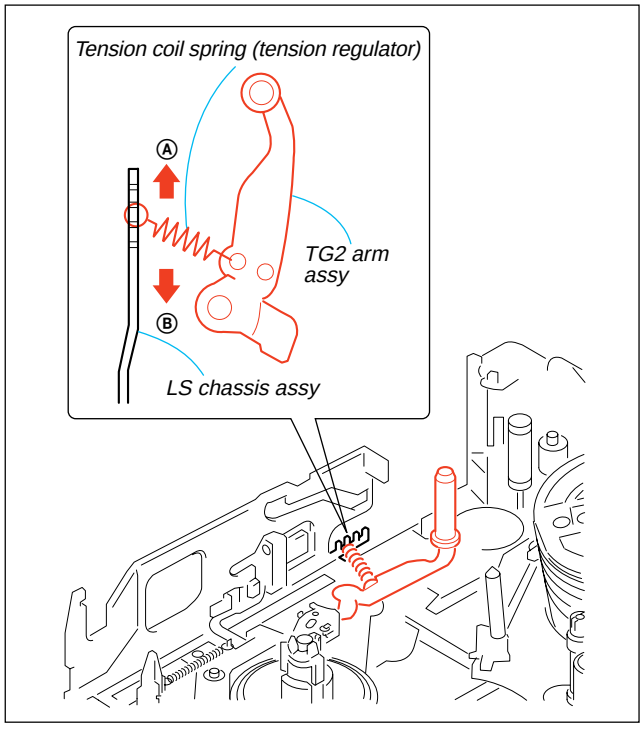


Fig. 4-7

4-4. TG3/TG5 Guide Fine Adjustment

1) Play back the tracking alignment tape (XH 2-1) (Ref. No. J-5).
2) Adjust the TG3 so that the RF envelope has the larger amplitude at the entrance side first, than adjust TG3 guide for flat amplitude. (Refer to Fig. 4-8.)
3) Adjust the TG5 so that the RF envelope has the larger amplitude at the exit side first, than adjust TG5 guide for flat amplitude. (Refer to Fig. 4-9.)

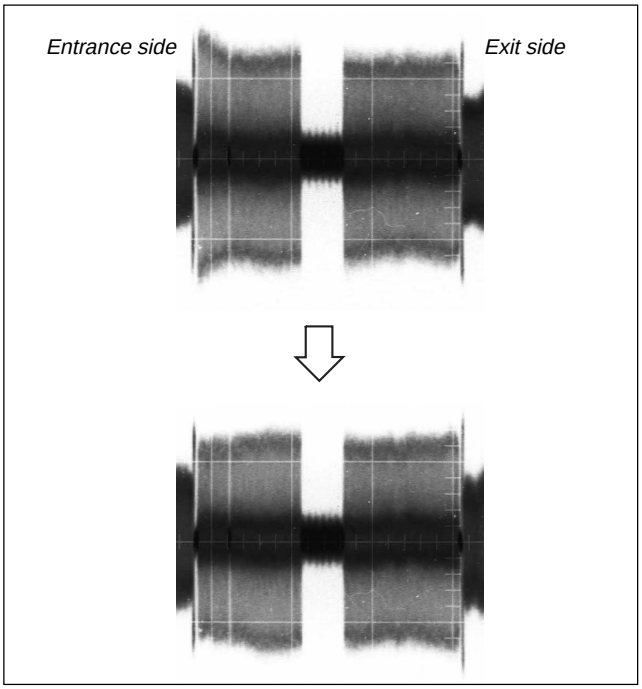


Fig. 4-8

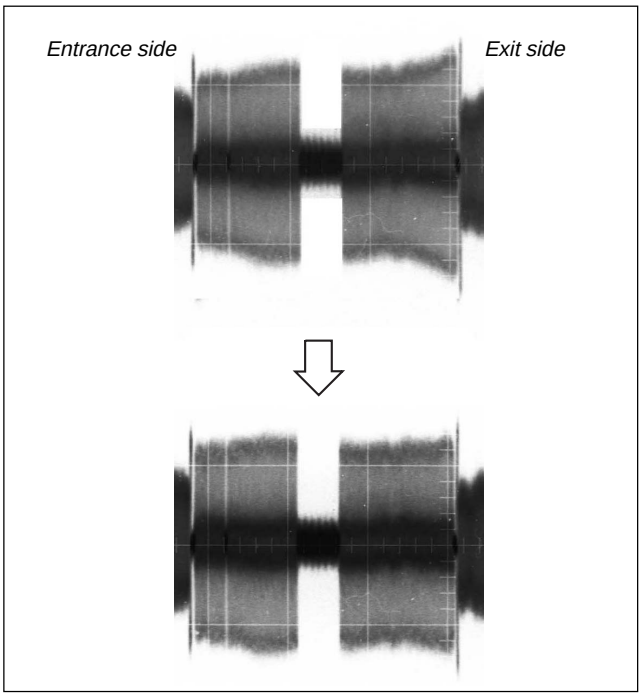


Fig. 4-9

4-5. Tape Run Check

1) Play back the tracking alignment tape (XH 2-1) (Ref. No. J-5). Establish the CUE mode first then the REV mode. Confirm in the respective modes that there are no large tape curls at the upper flange of TG3 and TG5. Then confirm in the respective modes that there are no large tape curls at the upper and lower flanges of TG1 and TG7.

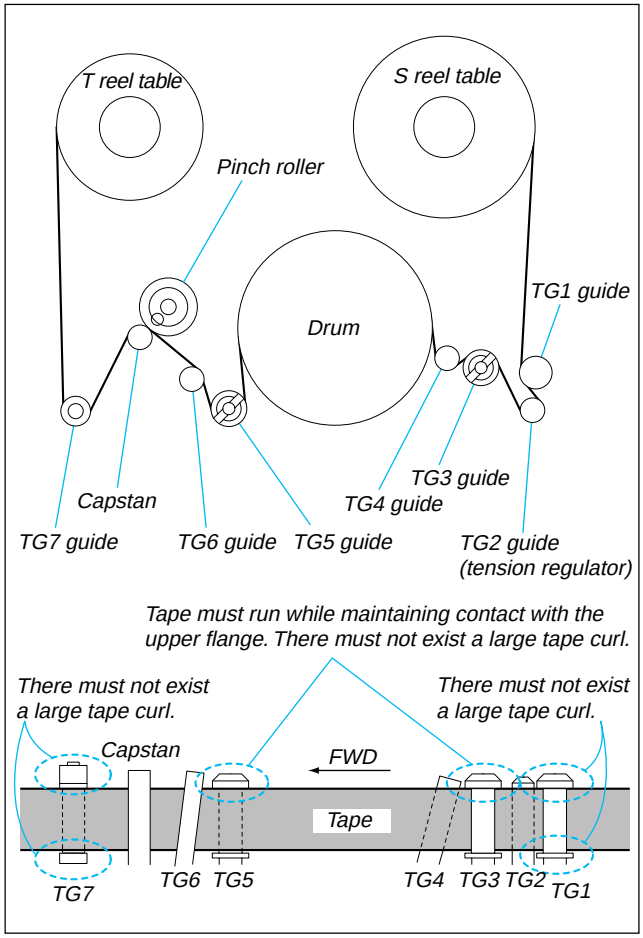


Fig. 4-10

4-6. Check upon Completion of Adjustment

1. Tracking Check

1) Play back the tracking alignment tape (XH 2-1) (Ref. No. J-5).
2) Establish the CUE (or REV) mode. Take the amplitude (A) in this mode as the 100% waveform amplitude. (Refer to Fig. 4-11.)
3) Establish the FWD mode. Confirm that the difference between the minimum (E min) and the maximum (E max) is less than 30%. (When taking the amplitude (A) in the CUE or REV mode as 100%)

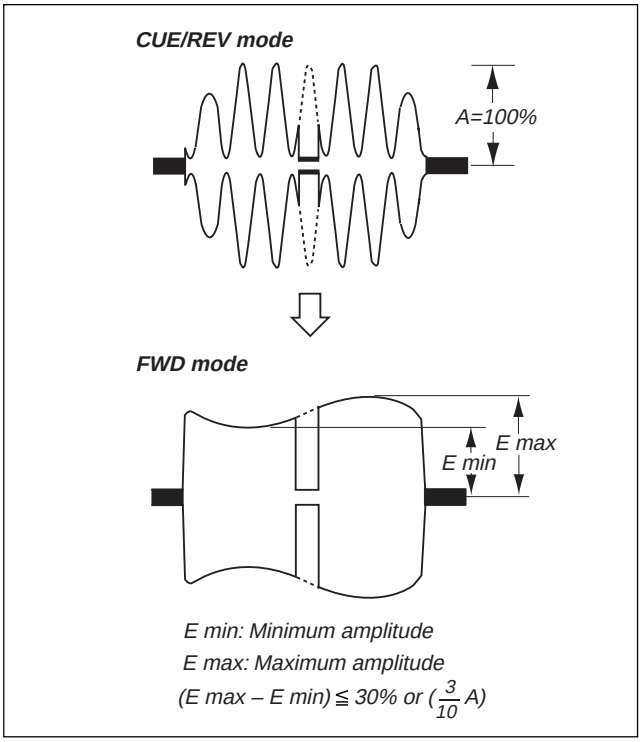


Fig. 4-11

4) Confirm that the RF waveform does not have excessive fluctuation of amplitude. (Fluctuation of amplitude should be 10% or less at both entrance side (B) and exit side (C), when taking the amplitude (A) in the CUE or REV mode as 100%)

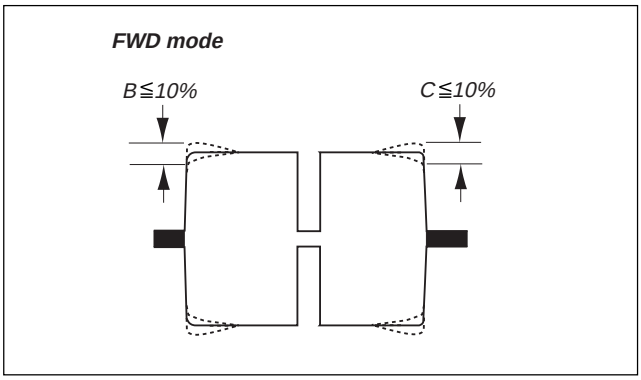


Fig. 4-12

2. CUE/REV Check

1) Play back the tracking alignment tape (XH 2-1) (Ref. No. J-5).
2) Establish the CUE mode. Confirm that the pitches between the peaks of the RF waveform are equally spaced. Also confirm that the RF waveform amplitude at entrance side (B) and exit side (C) is 50% or more respectively, when taking the amplitude (A) in the CUE or REV mode as 100%.
3) Establish the REV mode. Confirm that the pitches between the peaks of the RF waveform are equally spaced. Also confirm that the RF waveform amplitude at entrance side (B) and exit side (C) is 50% or more respectively.

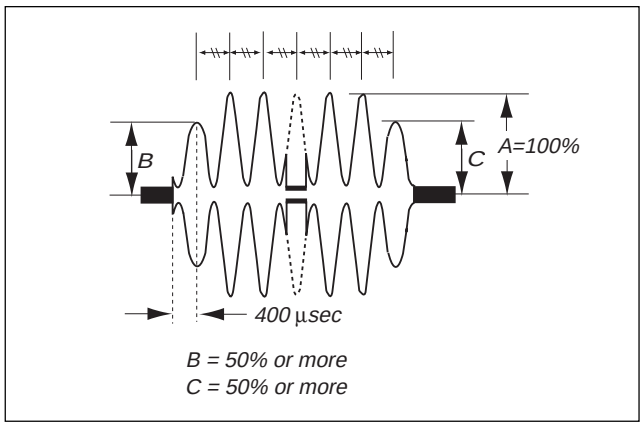


Fig. 4-13

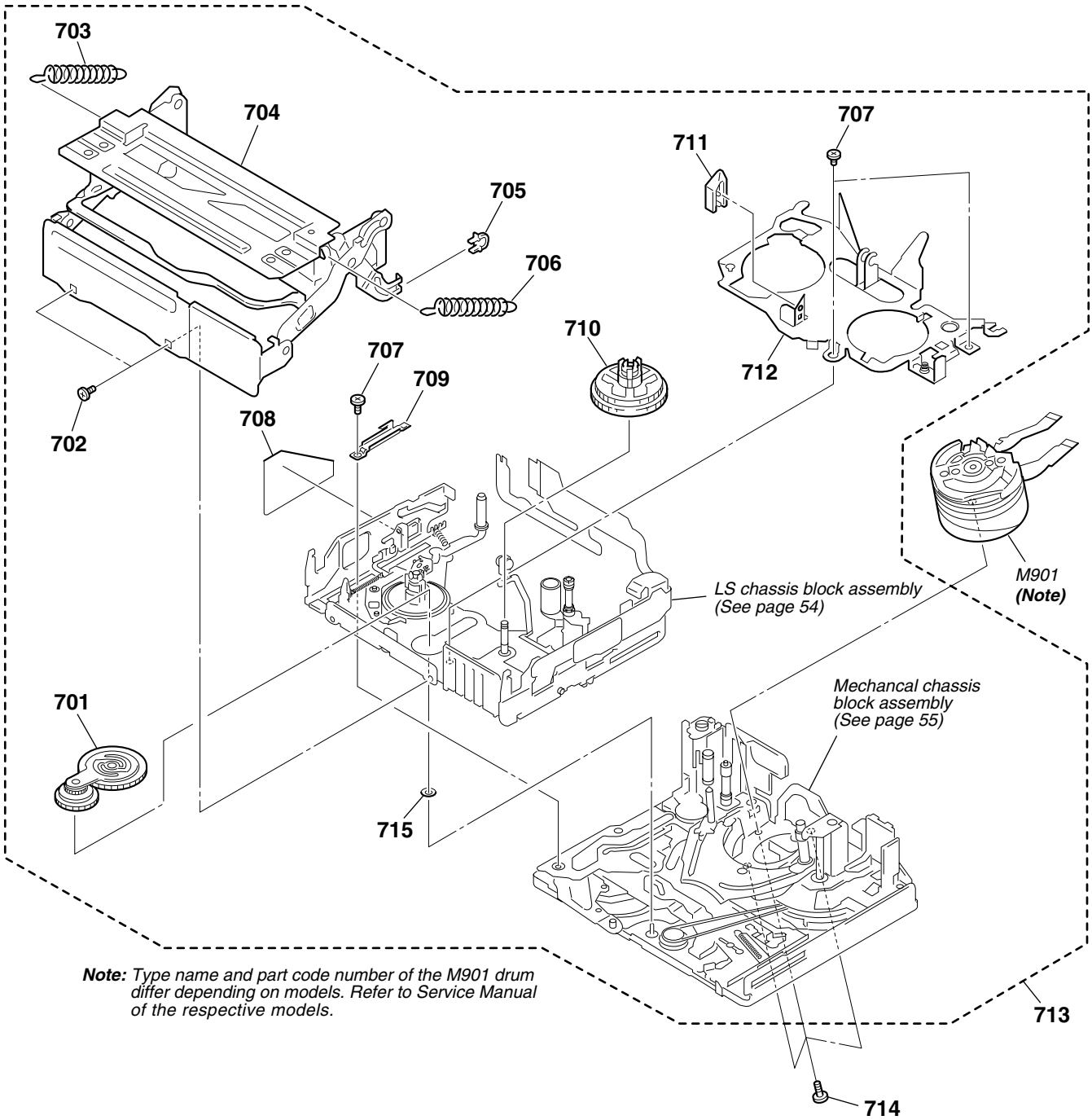
3. Rise-up Check

1) Play back the tracking alignment tape (XH 2-1) (Ref. No. J-5).
2) Change the modes from CUE mode to FWD. Confirm that the RF waveform rises up within two seconds when the mode is changed from CUE mode to FWD.
3) Change the modes from REV mode (two seconds or more of REV and to the FWD within five seconds) to FWD. Confirm that the RF waveform rises up within two seconds when the mode is changed from REV mode to FWD.
4) Change the modes from STOP mode to FWD. Confirm that the RF waveform rises up within two seconds when the mode is changed from STOP mode to FWD.

5. Exploded Views

NOTE:
- -XX, -X mean standardized parts, so they may have some differences from the original one.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.

5-1. Overall Mechanism Deck Section (Z100)

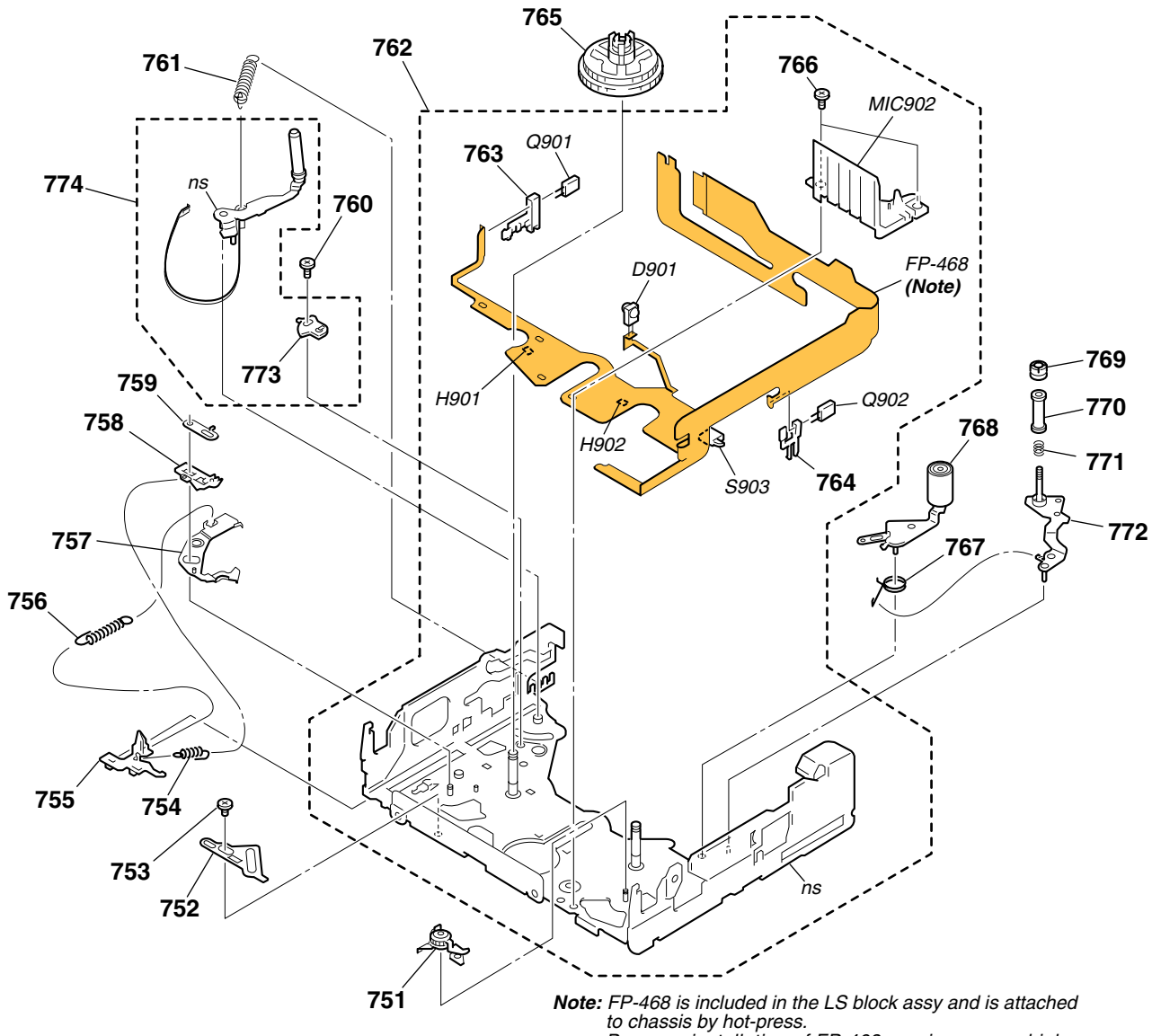


Note: *Type name and part code number of the M901 drum differ depending on models. Refer to Service Manual of the respective models.*

Ref. No.	Part No.	Description
701	X-3952-938-3	GEAR ASSY, GOOSENECK
702	3-075-097-11	SCREW (M1.4X1.4), SPECIAL HEAD
703	3-079-206-02	SPRING (POP UP S), EXTENSION
704	X-3952-939-3	COMPARTMENT ASSY, CASSETTE
705	3-079-367-01	DAMPER, CASSETTE COMPARTMENT
706	3-079-215-02	SPRING (POP UP T), EXTENSION
707	3-703-816-15	SCREW (M1.4), SPECIAL HEAD
708	3-080-545-01	COVER, SENSOR S
709	3-079-364-01	RETAINER, LS GUIDE
710	X-3952-937-1	TABLE ASSY, T REEL
711	3-079-366-01	RELEASE, REEL LOCK
712	X-3953-257-1	PLATE ASSY, RETAINER
713	A-7095-393-A	MD (Z100) SUB ASSY
714	3-079-741-02	SCREW,DRUM FIXING
715	3-748-682-01	WASHER,T
M901	– Note –	DRUM (DEH-30A-R)(SERVICE)

5-2. LS Chassis Block Assembly

ns : not supplied



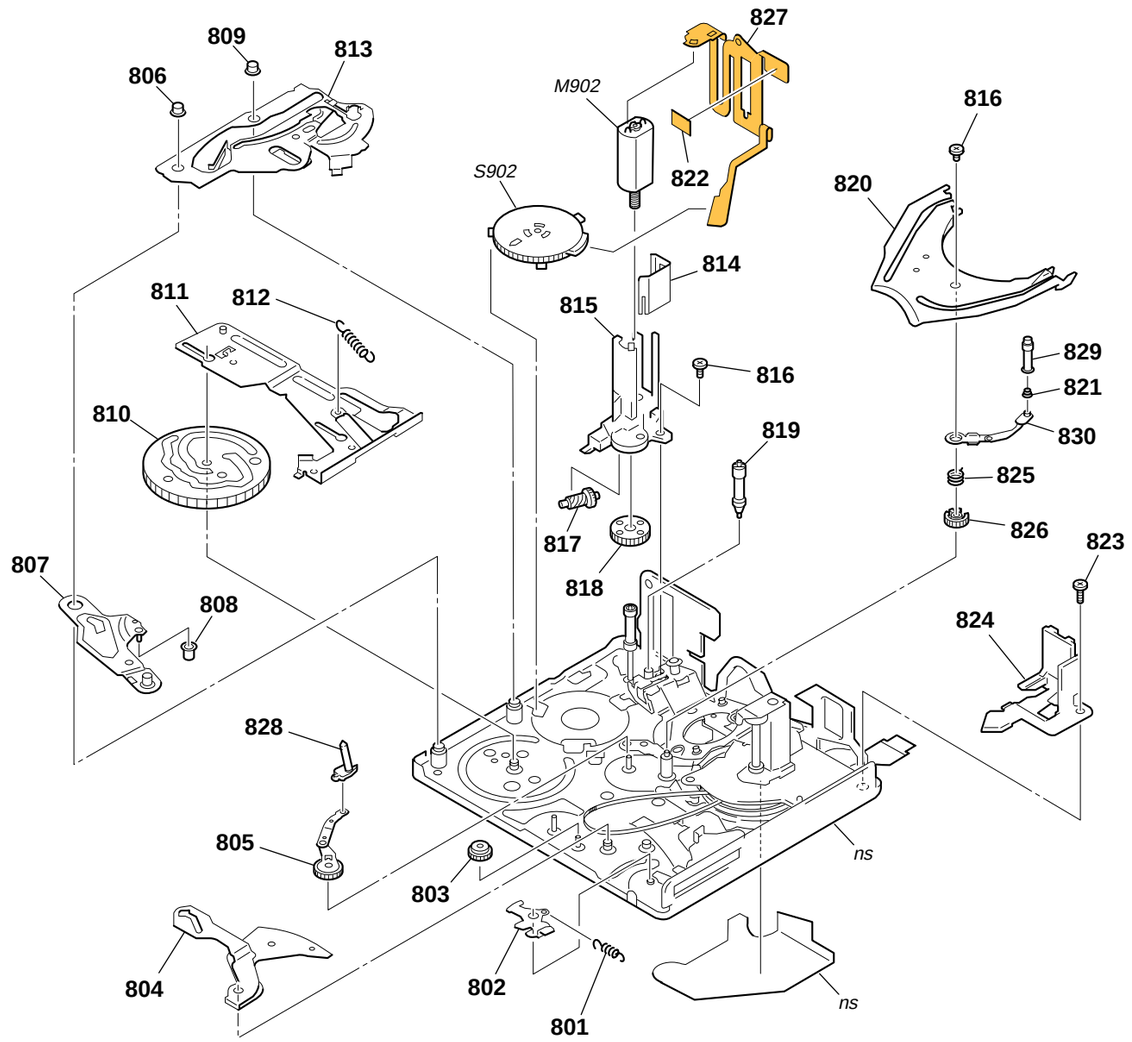
Note: *FP-468 is included in the LS block assy and is attached to chassis by hot-press.*
Because installation of FP-468 requires a very high accuracy, FP-468 is not supplied as an independent service parts.

Ref. No.	Part No.	Description
751	A-7095-402-B	BRAKE (T) BLOCK ASSY
752	3-079-241-01	PLATE, LS CAM
753	3-075-097-11	SCREW (M1.4X1.4), SPECIAL HEAD
754	3-079-246-01	SPRING (RELEASE RACK),EXTENSION
755	3-079-248-01	POSITIONING (S), CASSETTE
756	3-079-244-01	SPRING (ULE), EXTENSION
757	X-3952-932-1	BRAKE ASSY, ULE
758	3-079-245-01	RACK (S), RELEASE
759	3-079-247-01	BRAKE (S)
760	3-059-090-11	SCREW (M1.4X2.5), SPECIAL HEAD
761	3-079-242-01	SPRING, TENSION (TENSION REGULATOR)
762	A-7095-401-A	LS BLOCK ASSY
763	3-079-267-01	HOLDER (S), SENSOR
764	3-079-268-01	HOLDER (T), SENSOR
765	X-3952-936-2	TABLE ASSY, S REEL

Ref. No.	Part No.	Description
766	3-703-816-15	SCREW (M1.4), SPECIAL HEAD
767	3-079-243-01	SPRING (PINCH RETURN), TORSION
768	X-3952-934-1	ARM ASSY, PINCH
769	3-052-062-02	NUT, TG7
770	3-079-219-02	TG7
771	3-081-591-01	SPRING, COMPRESSION (TG7)
772	X-3952-935-3	ARM ASSY, TG7
773	3-079-237-01	ADJUSTOR, BAND
774	A-7095-403-B	TG2 ARM BLOCK ASSY
D901	6-500-471-01	DIODE GL453E00000F (TAPE LED)
H901	8-719-067-74	ELEMENT, HOLE HW-105A-CDE-T (S REEL)
H902	8-719-067-74	ELEMENT, HOLE HW-105A-CDE-T (T REEL)
MIC902	1-817-175-12	PIN, CONNECTOR (WITH DETECTION SWITCH)
S903	1-529-566-51	SWITCH, PUSH (1 KEY) (C.C. DOWN)
Q901	6-550-402-01	TRANSISTOR PT4850FE000F (TAPE END)
Q902	6-550-402-01	TRANSISTOR PT4850FE000F (TAPE TOP)

5-3. Mechanical Chassis Block Assembly

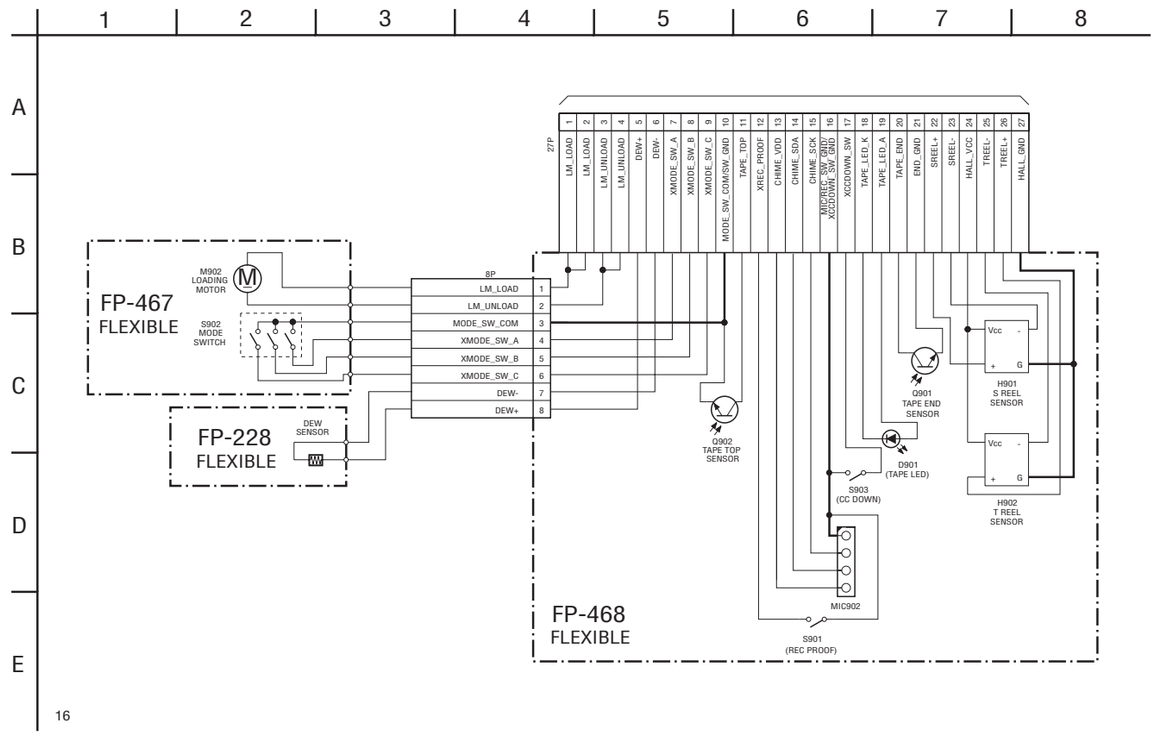
ns : not supplied



Ref. No.	Part No.	Description
801	3-079-314-01	SPRING (EJ), EXTENSION
802	3-079-327-01	ARM, EJ
803	3-079-323-02	GEAR, CONVERSION
804	3-079-324-02	ARM, GL DRIVING
805	X-3952-928-1	GL (S) ASSY
806	3-079-315-01	ROLLER (S1), LS GUIDE
807	X-3952-925-1	ARM ASSY, LS
808	3-079-320-01	ROLLER, LS
809	3-079-316-01	ROLLER (S2), LS GUIDE
810	3-079-319-01	GEAR, CAM
811	X-3952-941-1	SLIDER ASSY, M
812	3-079-321-02	SPRING (PINCH), EXTENSION
813	X-3952-940-2	PLATE ASSY, TG2 CAM
814	3-079-312-01	SHIELD, MOTOR
815	3-079-307-01	HOLDER, MOTOR
816	3-703-816-15	SCREW (M1.4), SPECIAL HEAD

Ref. No.	Part No.	Description
817	3-079-308-01	SHAFT, WORM
818	3-079-309-01	GEAR, DECELERATION
819	X-3952-942-2	ROLLER ASSY, TG3
820	3-079-325-01	RAIL, GUIDE
821	3-079-295-02	SPRING, TG5
822	1-677-049-11	FP-228 FLEXIBLE BOARD (DEW SENSOR)
823	3-079-328-01	SCREW ,SPECIAL (EG GRIP)
824	3-079-326-02	SUPPORT, TG7
825	3-079-301-01	SPRING (GLT), TORSION
826	3-079-298-01	GEAR (T), GL
827	1-686-798-11	FP-467 FLEXIBLE BOARD
828	X-3952-927-2	COASTER (S) ASSY
829	X-3952-930-3	ROLLER ASSY, TG5
830	X-3952-929-3	COASTER (T) ASSY
M902	A-7095-396-A	MOTOR BLOCK ASSY, L (LOADING)
S902	1-477-679-11	ROTARY, ENCODER (SWITCH)

6. Schematic Diagrams



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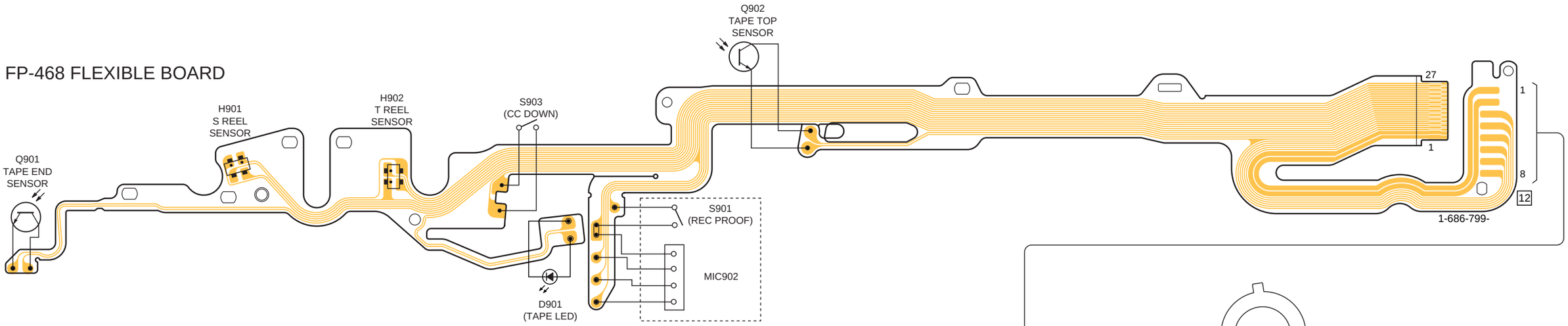
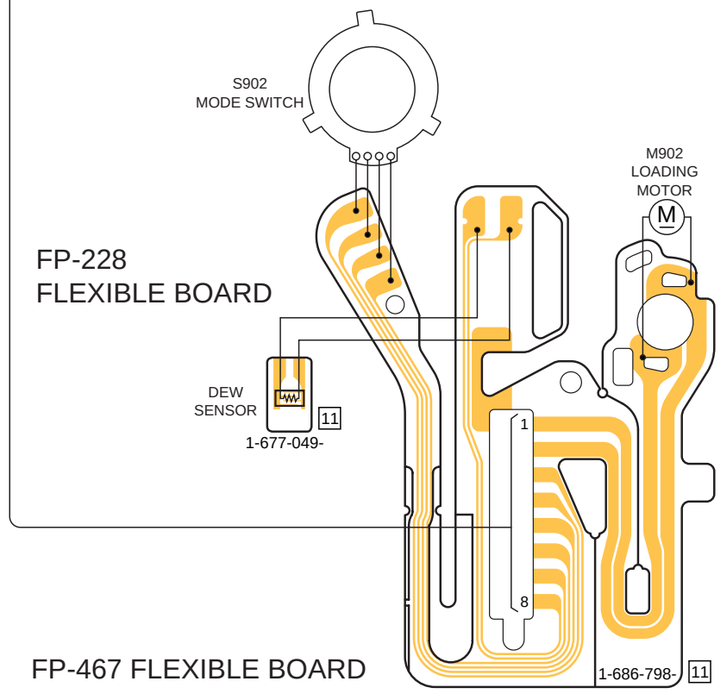
7. Printed Wiring Boards





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Revision History

Ver.	Date	History	Contents	S.M. Rev. issued
1.0	2003.01	Official Release	—	—